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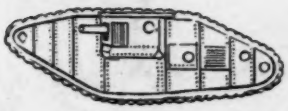

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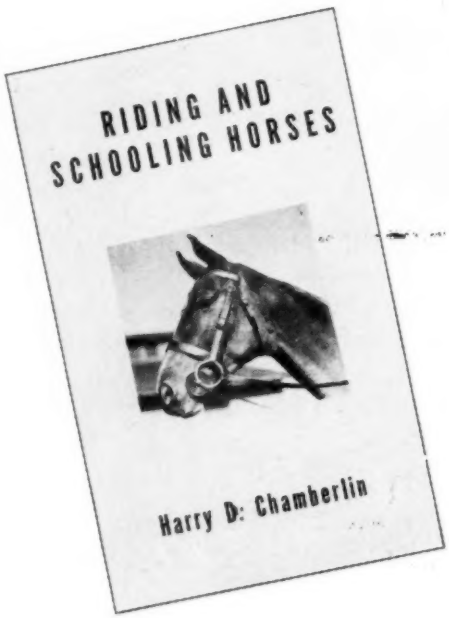

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Stockpiling: A Natio

*by Major General Sidney P. Spalding, USA**

"Stockpiling is not a difficult project to understand. Generally speaking, creation of a stockpile of strategic material is not dissimilar to the ordinary insurance policy a person takes out on life or property. You pay a premium and receive helpful payment in the event of an accident or loss. In stockpiling, the United States invests hundreds of millions of dollars in the future."

STOCKPILING of strategic and critical materials as a component of the national security program of the United States is good business judgment on the part of this nation's planners. For the public of our Nation, it is a sound investment—sound from the standpoint of defense; sound from the standpoint of economy.

Stockpiling is not a difficult project to understand. Generally speaking, creation of a stockpile of strategic material is not dissimilar to the ordinary insurance policy a person takes out on life or property. You pay a premium and receive helpful payment in the event of an accident or loss. In stockpiling, the United States invests hundreds of millions of dollars, and may invest billions of dollars in the future. This money purchases and retains great quantities of materials necessary to wage a successful war in defense of our country and our principles.

From the "defense" angle, the value of a stockpile is immeasurable. When our nation girds for war, the expansion of our industrial might invariably outdistances the expansion of our production of many strategic materials. Consequently, it is necessary to have on hand a sufficient amount of these materials to cover the gap left by the outdistancing of the industrial expansion over the expansion of the producing element. Another necessity for stockpiling relative to defense is the fact that many of these strategic materials are received from foreign sources—sources which may be within enemy land in time of war, under enemy control, or at the end of a sealane cut by enemy military forces. Still another and great element is the element of transportation. In times of emergency, our systems of transportation—rail, air, and sea—are often strained to a point where our transportation facilities are devoted in great part to other necessary activities of war. Consequently, it is necessary to have on hand a supply of such materials to cover all such contingencies.

The objective of the stockpiling program for strategic and critical materials against a future emergency is based primarily on determination of need, determination of amount, and availability of sources and amounts. Procurement hinges on availability, costs, and whether such procurement might come into conflict with and hinder our postwar civilian economic restoration.

Generally, the over-all cost of the stockpiling program has been estimated to be between $2,100,000,000 to two and one-half billion dollars, with the necessary stockpiles achieved, if all goes well, within a five year period. These, of course, are estimates subject to change by many conditions such as those governing appropriations, prices, and availability of materials.

The Army and Navy Munitions Board, charged with the administration of the Stockpiling Act, Public Law 520, 79th Congress, arrives at determination of needs from the military experts in respective fields of munitions, and from experts from all phases of the civilian

*Deputy Executive Chairman (Army) Army and Navy Munitions Board.

ol Defense Assurance

and industrial elements of the nation and government. Such needs and amounts are determined by the War, Navy and Interior Departments and a number of other related government agencies. Coupled with this is the knowledge derived from certain civilian industry advisory committees, which assist the board in stockpiling, Industrial Mobilization Planning, and other activities with which the Army and Navy Munitions Board is charged.

Amounts are estimated from experience and from thoroughly considered analyses of possible future requirements in a war of indeterminate length.

Upon determination, within the limits of funds appropriated each fiscal year, the Board can then indicate to the Bureau of Federal Supply, Treasury Department, the amount to be purchased.

The purchase will be made (1) if the cost is not excessive and (2) if such a purchase will not interfere with the Nation's economic recovery from the strain of the last war.

The method of procurement is not glamorous as many seem to think. There are no "cloak and dagger" commercial agents spying on the sources of supply of the desired materials. There are no "commercial attaches" following our diplomats about or attached to our Embassies arranging deals in scarce material as has been pictured by some. It is a businesslike arrangement along the lines of normal government procurement.

First, those lists of materials declared strategic and critical are known. Persons or companies the world over capable of providing the United States with these materials are invited to submit their names, and these names are investigated to determine the legality of the person as a producer—not a speculator. Then, when a certain quantity of a specific material is desired for purchases, the Federal Bureau of Supply, which is charged with all the purchase activities for the stockpile, will invite specific individuals or companies to submit bids. The contract is awarded to the lowest bidder who can produce the desired materials in accordance with Munitions Board specifications. A "Buy American" clause provides that material indiginous to the United States will be purchased at home insofar as practicable.

Upon procurement of the desired materials, they are placed in adequate storage—storage which will protect them from deterioration as long as possible. In storage —in the possession of the Government—they are what constitute a "Stockpile."

The amounts of the strategic materials acquired and stockpiled are kept secret for obvious reasons. No publicity is given to the amount desired for stockpiling purposes. One reason is strictly military. A country doesn't reveal its military secrets to all comers, for one of the greatest assets of a nation is to know the military strength and military potentiality of an enemy or of a prospective enemy. Another reason is to avoid speculation on the stockpiling activities. Such speculation could effect the commercial markets, causing great hardships in that respect.

Relative to this last condition, the Army and Navy Munitions Board cannot "dump" stockpiled material on the market promiscuously and irresponsibly. If future requirements indicate that the stockpiling of a certain material is no longer feasible, due to technological obsolescence, the Board must file notice with Congress of this fact; after approval of that governmental body no disposition may be made until six months after publication of such intention in the Federal Register. A system of rotation is used in the stockpiles. This provides for renewing materials before they deteriorate in any respect, which, of course, guarantees stockpiles of usable materials, and the utilization of older material commercially before it has deteriorated. Rotation of a material before deterioration also guarantees against great financial loss in maintaining the stockpile.

Definitively, strategic and critical materials are those materials required for essential uses in a war emergency, the procurement of which in adequate quantities, quality, and time is sufficiently uncertain for any reason to require prior provision for the supply thereof.

Materials for stockpiling are placed in three categories, groups A, B, and C. Group A comprises those strategic materials for which stockpiling is deemed the only satisfactory means of insuring an adequate supply for a future emergency. Group B comprises additional strategic and critical materials the stockpiling of which is practicable. The Army and Navy Munitions Boards recommends their acquisition only to the extent they may be made available for transfer from surpluses of Government agencies, because adequacy of supply can be insured either by stimulation of existing North American production or by partial or complete use of available substitutes. Group C comprises those strategic and critical materials which are not now recommended for permanent stockpiling because in each case difficulties of storage are sufficient to outweigh the advantages gained by this means of insuring adequate future supply.

The items on the current list of strategic and critical materials and the major United States sources from which they are drawn are as follows:[1]

A cursory glance at this list immediately indicates

[1]The sources are not listed in accordance with their importance as a volume source, i.e. the first country listed for a material does not mean the United States purchases more of the specific material from that country than from the others.

Principal United States Sources of Supply

Group "A" and Group "B" and Group "C"

Group A

Material	*Location*
Agar	Japan
	U.S.
Antimony	Bolivia
	Argentine
	Chile
	Peru
	Mexico
	China
	Yugoslavia
	Czechoslovakia
	Turkey
	Algeria
	Australia
	U.S.
	Italy
Asbestos Rhodesian Chrysotile	Sou. Rhodesia
So. Africa Amosite	Un. of S. Africa
Bauxite	U.S.
	Br. Guiana
	Surinam
	Hungary
	France
	USSR
	Greece
	Italy
	Yugoslavia
	Neth. Indies
	Malaya
Beryl	U.S.
	Argentina
	Brazil
	Australia
	India
	Un. of S. Africa
	Portugal
Bismuth	U.S.
	Canada
	Mexico
	Peru
Cadmium	U.S.
	Mexico
	Canada
	Australia
	Germany
	France
	Belgium
	Belgian Congo
	Argentina
Castor Oil	Brazil
	India
	Manchuria
	Haiti
	U.S.
Celestite	U.S.
	Mexico
	British Isles
	Spain
Chromite Metallurgical	U.S.
	Fr. Oceana
	Sou. Rhodesia
	India
	Turkey
	Un. of S. Africa
	New Caledonia
	Canada
	Cuba
	USSR
Refractory Rhodesian	Sou. Rhodesia
Other Origin	Cuba
	Philippines
	India
	Un. of S. Africa
	Greece
Cobalt	U.S.
	Canada
	Germany
	Finland
	Belgian Congo
	Fr. Morocco
	N. Rhodesia
	Burma
Coconut Oil	Philippines
	Neth. E. Indies
	Malaya
	Ceylon
	Br. Oceana
	Fr. Oceana
	India
	Honduras
	U.S.

Material	*Location*
Columbite	Nigeria
	Brazil
	S. Africa
	Argentina
Copper	U.S.
	U.S. (Sec.)
	Chile
	Mexico
	Canada
	Rhodesia
	USSR
	Peru
Cordage fibers Manila	Panama
	Philippines
	Neth. E. Indies
Sisal	Neth. E. Indies
	Belgian Congo
	Caribbean Is.
	Central America
Corundum	Un. of S. Africa
	So. Rhodesia
Diamonds Industrial	Belgium
	Belgian Congo
	Br. Isles
	Un. of So. Africa
	Netherlands
	Gold Coast
	Canada
	Brazil
Emetine	Nicaragua
	Costa Rica
	Columbia
	Brazil
	U.S.
Graphite Amorphous	Ceylon
Lump	
Flake	Madagascar
	U.S.
Hyoscine	Australia
Iodine	U.S.
	Chile
	USSR
	Neth. E. Indies
	Japan
	France
Jewel Bearings Instrument Rings	U.S.
	Switzerland
Sapphire Vees	U.S.
	Switzerland
Watch Rings	U.S.
	Switzerland
Kyanite, Indian	India
Lead	U.S.
	U.S. (Sec.)
	Canada
	Mexico
	Peru
	Australia
	Germany
	Belgium
	Italy
Manganese Ore Battery Gr.	U.S.
	Fr. Morocco
	Gold Coast
	India
	Un. of S. Africa
Metallurgical Gr.	U.S.
	Cuba
	Mexico
	Brazil
	USSR
	Gold Coast
	India
	Un. of S. Africa
Mercury	U.S.
	Mexico
	Canada
	Chile
	Italy
	Spain
	USSR
Mica Muscovite block & film (good stained & better)	U.S.
	Canada
	Argentina
	Brazil
	India

Material	*Location*
Muscovite Splittings	India
Phlogopite Splittings	Canada
	Mexico
	India
Monazite	Brazil
	Br. Isles
	Neth. E. Indies
	India
Nickel	U.S.
	Canada
	Cuba
	New Caledonia
	USSR
	Burma
Opium (Contained Morphine)	Un. Kingdom
	Netherlands
	Turkey
	Yugoslavia
	Afghanistan
	India
	Switzerland
Palm Oil	Canada
	Belgian Congo
	Nigeria
	Neth. E. Indies
	Br. Malaya
Pepper	Neth. E. Indies
	India
	Fr. Indo China
Platinum Gr. Metals	
Iridium	U.S. (inc. sec.)
	Canada
	Un. Kingdom
	Norway
	Columbia
	USSR
Platinum	U.S. (inc. sec.)
	Canada
	Columbia
	Br. Isles
	USSR
	Un. of S. Africa
Pyrethrum (20% extract)	Brazil
	Belgian Congo
	Br. E. Africa
	Yugoslavia
	Japan
Quartz Crystals	Brazil
Quebracho	Argentina
	Paraguay
Quinidine	Neth. E. Indies
	Un. Kingdom
	Germany
Quinine	Neth. E. Indies
	Un. Kingdom
	Ecuador
	Costa Rica
	Guatemala
	Switzerland
	Germany
Rapeseed Oil	Argentina
	Netherlands
	Un. Kingdom
	Japan
Rubber Crude Natural	Neth. E. Indies
	Br. Malaya
	Ceylon
Natural Latex	Fr. Indo China
	Siam
	India
	Liberia
	Brazil
	Mexico
	Central America
	South America
Rutile	U.S.
	Brazil
	Australia
	Fr. Cameroons
	India
	Nigeria
	Norway
Sapphire & Ruby	U.S.
	Switzerland
Shellac	India

Material	*Location*
Sperm Oil	U.S.
	Canada
	Netherlands
	Norway
	Un. Kingdom
	Falkland Is.
Talc, Steatite (block or lava)	U.S.
	India
	Manchuria
	Italy
Tantalite	U.S.
	Brazil
	Belgian Congo
	Br. E. Africa
	Netherlands
	Australia
	Sou. Rhodesia
Tin	Br. Malaya
	Neth. E. Indies
	Bolivia
	Belgian Congo
	Nigeria
	China
	Thailand
	Portugal
	U.S. (sec.)
Tung Oil	U.S.
	China
	Brazil
Tungsten	U.S.
	Mexico
	Brazil
	Bolivia
	Peru
	Argentina
	Neth. E. Indies
	China
	Burma
	Chosen
	Portugal
Vanadium	U.S.
	Mexico
	Peru
	Argentina
	Un. of S. Africa
	N. Rhodesia
Zinc	U.S.
	Canada
	Newfoundland
	Mexico
	Argentina
	Chile
	Peru
	France
	Belgium
	Belgian Congo
	Great Britain
	Germany
	Poland
	Australia
	USSR
Zirconium Ores Baddeleyite	Brazil
Zircon	U.S.
	Brazil
	Australia
	India

Group B

Material	*Location*
Aluminum Ingot	U.S.
	Canada
	France
	Italy
	Germany
	Norway
	Switzerland
	Un. Kingdom
	USSR
	Japan
Calcite (Optical)	U.S.
	Iceland
	So. Africa
Chalk, English	England
Chromite Ore (Chemical Grade)	Sou. Rhodesia
	Turkey
	Un. of S. Africa
	Yugoslavia
	Greece
	New Caledonia
	U.S.
	USSR
Cryolite, Natural	Greenland
Diamond Dies	Netherlands
	France
	United Kingdom
	U.S.
Emery	U.S.
	Turkey
	Greece
Fluorspar Acid Grade	U.S.
	Germany
	Newfoundland
	Un. of S. Africa
	France
	Spain
	Mexico
Metallurgical Grade	U.S.
	Germany
	U.K.
	USSR
	Newfoundland
	France
	Spain
	Mexico
	S. Africa
	Chosen
	Italy
Graphite (Crystalline flakes)	Madagascar
	U.S.
Indium (Metallic)	U.S.
	Canada
	Germany
Jewel Bearings Other Instrument Jewels	U.S.
	Switzerland
Other Watch Jewels	U.S.
	Switzerland
Magnesium Ingot	U.S.
	Germany
	U.K.
	France
	Japan
Mica Muscovite block (Stained & lower)	U.S.
	India
	Brazil
	Argentina
	Peru
Phlogopite block (Amber)	Madagascar
	Canada
	Mexico
Molybdenum	U.S.
	Mexico
	Chile
	Norway
	Peru
Platinum Group Metals Osmium	Un. of S. Africa
	USSR
	Alaska
	U.K.
	Columbia
	U.S.
	Canada
Platinum	U.S.
	U.S. (Sec.)
	Canada
	Columbia
	U.K.
Rhodium	U.S. (Sec.)
	Canada
Ruthenium	U.S.
	U.S. (Sec.)
	Canada
	U.K.
Selenium	U.S.
	Canada
	Sweden
	Germany
Talc, Steatite Ground	U.S.
	Manchuria
	France
	Italy
	Norway
	Germany
	India
Wool	U.S.
	Australia
	New Zealand
	Argentina
	Br. So. Africa
	Chile
	Uruguay

Group C

Material	*Location*
Asbestos Canadian Chrysotile	Canada
Bristles Pig & Hog	U.S.
	China
Burlap, Jute	British India
	U.K.
	Czechoslovakia
Cordage Fibers Hemp, American	U.S.
	Mexico
Henequen	Cuba
	El Salvador
	Venezuela
Jute	British India
	Belgian Congo
Cork	Portugal
	Spain
	Algeria
	Morocco
	Italy
	France
Glass, Optical	U.S.
	Germany
Iron Ore	U.S.
	Chile
	Canada
	Cuba
	Brazil
	Sweden
	Norway
	Australia
Kapok	Netherland Indies
	Philippines
	Ecuador
	Brazil
	Dominican Republic
Leather Cattle Hides	U.S.
	Argentina
	Brazil
	Canada
	Cuba
Calf & Kip Skins	U.S.
	Argentina
	British India
	British E. Africa
Loofa Sponges	Japan
	Cuba
	Mexico
	Central America
	West Indies
Lumber Balsa	Columbia
	Costa Rica
	Ecuador
	Guatamala
	Mexico
	Nicaragua
Mahogany	Mexico
	Central America
	Gold Coast
	Ivory Coast
Petroleum & Petroleum Products	U.S.
	Venezuela
	Mexico
	Columbia
	Canada
	Trinidad
	Neth. W. Indies
Radium	U.S.
	Canada
	U.K.
Scrap, Iron & Steel	U.S.
	Canada
	Cuba
	Curacao
Sesame Oil	China
	India
	Manchukuo
	Nigeria
	Anglo Egyptian Sudan
	Tanganyika
Uranium	U.S.
	Canada
	U.K.

the absolute necessity for stockpiling the materials in peacetime against war emergencies. The increased supply of each material as necessitated by war is effected by the contingencies mentioned earlier. Rapid wartime industrial expansion exceeds expansion in the production of those materials indiginous to the United States or the North and South American continents. A supply is needed to carry U. S. Industry during the period in which the production of the materials is increased to meet the greater demand by industry. Materials from without the United States, subject to increased demand throughout the world, are also subject to possible enemy control. They may even become more unreachable should the activity of war strain or disrupt transportation facilities necessary to carry them to the U. S. So apparent are these factors, it is not difficult to realize what an essential component stockpiling of strategic and critical materials is to our national security.

In time, of course, this list will change. New scientific development, perfection of certain synthetics and substitutes, and the development or expansion of our own continental sources will cause new materials to be added to the list and some of the present items declared obsolescent for stockpiling purposes.

To date, since the reconstitution of the Army and Navy Munitions Board by the President in August of 1946 the passage of the Strategic and Critical Materials Stockpiling Act (Public Law 520—79th Congress), the stockpiling of the desired materials has progressed favorably, despite many unfavorable conditions.

World War II dissipated most of the existing stocks of these materials throughout the world, and in major sections thoroughly disrupted the producing facilities, creating major shortages. Since these materials are of prime industrial requisite, the shortages have hampered the restoration of normal peacetime economy. Consequently, since a strong civilian industry is of major importance to national security, the Army and Navy Munitions Board will not compete with the industry in the procurement of these materials unless conditions make such purchasing mandatory, i.e. specifically if world conditions indicated the U. S. had but little time in which to achieve its stockpiling goals.

This situation, naturally, made it almost impossible to engage in as great a stockpiling activity as is desired. However, fortunately, the residue of war left for the Board one source of supply which enabled it to start its endeavors and progress, although in a restricted sense.

On hand in the United States were materials required for stockpiling. They were in the possession of government agencies and the Armed Forces, charged with their procurement during the war years. When such materials were ascertained surplus to the military needs and to the civil economy of our nation, they were so declared and made available to the Army and Navy Munitions Board for stockpiling. The effect of this situation was threefold. It provided the opportunity for the nation to salvage some of the cost of World War II, made it possible for the Board to commence stockpiling without competing with the civilian economy, and eliminated "dumping" of materials, with its ruinous effect on the immediate postwar economy.

Now, as reconversion of our wartime economy to peacetime economy is progressing, the demands for strategic and critical materials will begin to level off to normal demand. Production sources throughout the world, made unproductive by the war, are beginning to operate again, offering these materials for world consumption. Consequently, as world wide supply and demand are achieved, the materials will be in less short supply, which, of course, will cause the envisioned stockpiles to become achievable.

So far, there has been indicated the need for stockpiles, what stockpiles are, the difficulties involved, and the progress made in stockpiling. It is only fair, in completing the picture of the stockpiling activities of the United States, to ask: "What about the future relative to stockpiling?"

In answering such a question, one favorable aspect of the problem must be indicated, first. It is definite that the people of the United States, through their representatives in Congress, are aware of the value and necessity of stockpiling strategic and critical materials. It was not always so. However, this was not totally the result of ignorance or indifference. Not too long ago in our history, stockpiling was not the essential component of national defense it is today. Progress in the science of war, and the ever increasing scale of war have brought about an evolutionary change in the scheme of things relative to war. At one time, war activity was superimposed on "business as usual." Present day demands of war have made this process strenuous almost to the point of the impossible. The future indicates that the total industrial, civilian, and military strength will be required to wage war.

Because of this, reserve strength in industry, resources, and personnel must be maintained in peacetime—at least until lasting peace is indicated—and it becomes logical to believe that if the military services need reserves of manpower, then our industry needs reserves of materials not easily acquired in wartime.

All this has made our people and their representatives and servants in government aware of the necessity of stockpiling war-scarce materials, and the Congress has given its full support to the project, as indicated in Public Law 520.

As to the future. . . . The fate of our stockpiling plans rest with the people and the Congress. It will depend on continued authorizations, continued appropriations in the amounts necessary to achieve the size and quality stockpile best able to assist the Nation in an emergency. Consequently, it is mandatory, in behalf of the security of the United States, that the awareness acquired by the people and the Congress, and the excellent support given the program be kept alive, continued until peace is achieved and such things as wars and stockpiles are no longer elements of civilization.

Under A Cloak Of Water

by Leonard J. Grassman

A strange weapon developed by the Japanese to thwart our efforts in invading the Jap homeland is revealed in this article by Leonard J. Grassman, a regular Armored Cavalry Journal contributor. The weapon was intended to reinforce Japanese Naval defenses of Japan.

MANY of the Allied intelligence reports compiled during the last phase of the war or early in the postwar period lacked much value in the military sense, but were greatly beneficial in providing well needed and well earned smiles and chuckles for the American community, and in satiating the thirst of curiosity of the general populace of the world concerning the confounded "secret weapons" of our erstwhile enemies.

Among the thousands of such mysterious weapons, which were repeatedly, reputed ready to turn the tide of war against the Allies one of the strangest was discovered by our investigators in Japan. Unveiled after occupation of Japan by our forces, it proved to be a combination of equipment designed to thwart our efforts in invading the Jap homeland.

Characteristic of all such secret weapons, in construction, it was hidden by a great veil of secrecy. In operation it was concealed by a greater cover—the veil of soft waters of the Pacific.

Apparently without a name, the device was prepared to carry the Nip tactical theory, "destruction of the enemy on the beaches" even further. It was designed to destroy the enemy—our forces—before they reached the sacred beaches of Japan. It was intended to reinforce Japanese Naval defense of Japan.

Upon investigation, American intelligence personnel discovered the secret coastal defense to be a system of submersible forts. Each tiny fort contained a complement of two men and housing for this crew, when submerged. There was also storage space for approximately 50 rounds of 37-millimeter ammunition for the gun mounted topside. Primarily, the remainder of the small defense element consisted of a ballast tank.

Theoretically, these submersible armed barges, prior to attack, woud be towed to their assigned positions, and sunk. Later, when the amphibian craft from the attacking enemy transports started shoreward, on signal, the gunner and the ammunition passer would pump madly on the handpump, raising the craft. By the time it was surfaced, the crew were completely exhausted, incapable of operating the gun. Consequently buoyancy tanks were installed, relieving the crew from the arduous pump operation.

Surfaced, the craft and its 37-mm would blast the oncoming landing craft from the water.

Two operating models of the little submarine forts were built for experimental purpose. They were designed to withstand pressures up to 100 feet, but normal operation was at 50 feet. They were tested in calm waters, and, it is anyone's conjecture what the result would be in rough water with the gun firing. Probably one seasickness tablet per round fired.

Communication contact with the crew was overlooked in the design and construction of the forts, and, upon discovery, suggestions ran from thumping the sides of the vessel to the far reaches of oriental imagination. No practical test of strung telephonic equipment was attempted.

Later experiments produced a mother ship for the sinking barges. Similar in most respects, the "sinkable Mammy" was equipped with a 15 horsepower oil engine, a 10 horsepower motor and steering equipment. It was also equipped with grapnels with which to free the unpropelled gun platforms should they become entangled in their own moorings.

As a supplement to the coastal defense system, they had suicide swimmers, equipped with underwater suits and small, powerful mines. Trained in group units, the swimmers had the hoped-for effect of a squadron of one-man submarines without the submarines. Apparently, their suits became waterlogged because there is no record of an allied craft being sunk by a man-propelled mine.

At first glance, it is quite evident that such devices

as these are militarily out of bounds. Their effect, at most, would be inconsequential, causing but momentary delay in an attack. With this fact in mind, a natural question arises. Why, then, should the Japanese strategists have wasted time, money and skill playing around with such nonsensical gadgets?

The answer is desperation.

With an over-all strategy based on successful aggression, the Japs ignored defense measures until they were on the defensive. From the beginning, they planned seizure of vast areas, away from the homelands, and, short of complete victory over the enemy, a far-flung fight so costly to the enemy that a negotiated peace would be the only logical conclusion, leaving Japan with much war-won territory after the peace had been negotiated.

When it became apparent that the Japanese forces could not hold out against U.S. military might, and were being forced farther and farther back toward the homeland, the Japs found themselves without a homeland defense and began casting about for such a defense. The last hope was to make the taking of Japan proper so costly, the Allies would negotiate, letting the Nips off lightly. As always, a war-weakened nation cannot improvise last minute defenses against a powerful, victorious force.

Oddly enough, the lesson illustrated in that foolish activity was not new with the Japs. It has been a mistake made time and time again throughout the military history of this world. In France's preparation against possible Germanic aggression, it was made. The French neglected to complete the Maginot Line—to protect a rich industrial area—and justified this weakness with a strategy of placing an offensive force in Belgium to cover the gap. This, along with the strategy of fighting behind the Maginot spelled defeat. Confidence in the Maginot Line and the supporting strategies left no room for planning against miscarriage of that strategy.

The mistake lies in the neglect of planning beyond a planned strategy—in taking into consideration what measures must be adopted if (1) the strategy is not successful and (2) if it is more successful than anticipated.

At the moment, in a chaotic world, our military planners have much with which to contend. They can hope for peace but must plan for war. In that planning may lie the fate of our nation, and the silly lesson of the Japanese sinkable fortettes, comic as it is, may well be posted as a reminder that when planning an offensive defensive against aggression, one must also count on the possibility of being reversed to the point of a defensive offensive—permitting the enemy to expend its aggressive might against our defenses.

Recently, in conversations with some of our strategists, the talk turned to the "polar concept." As the conversations continued, it was apparent there was some misunderstanding. Moments later, the misunderstanding was diminished somewhat. One of the gentlemen straightened the matter out by noting that there are quite a number of "polar concepts"—an Air Force polar concept, a Navy polar concept, a ground force polar concept, a magazine polar concept and the press associations' polar concepts, along with many others, individual in themselves or a combination of several of the others.

More talk eliminated all but one of the "concepts," and the conversation centered on that one. It was noted that all consideration was centered on the offensive strategy within the sphere of the particular concept range, and consideration given to the possibilities of attack within the same concept. The head was protected but the body exposed.

Questions about this factor brought rather glib assurances that the Navy, the natural hindrances and friendly nations took care of all that, and, logically enough, it seemed quite true that that was the case. However, IF these elements proved incapable of the defense apparent, what then? Would the U.S., in desperation, resort to sinkable tin cans?

RIDING AND SCHOOLING HORSES

By The Late Brigadier General Harry D. Chamberlin

The Principles of Equitation are laid down in this book in language understandable by everyone. It is a book written to help the reader become a better horseman. There are chapters on Seat, Hands, Application of the Aids, Saddlery, Schooling, and Jumping. This famous book, which has been out of print for some time, has been republished by the Armored Cavalry Journal. The price of the book is $4.00 a copy. Place your order now.

2d Armored Division Combat Loading

Sicily

PART TWO

by Lieutenant Colonel F. M. Muller

THE Sicilian invasion, better known then as operation Husky, was conducted by the Seventh U. S. Army, under the command of Major General George S. Patton, Jr., in conjunction with military forces of the United Kingdom.

The general over-all American plan called for three American landings against the southern coast of Sicily in conjunction with an airborne operation. The 45th Infantry Division was to land in the vicinity of Victoria, the 1st Infantry Division to land in the vicinity of Gela, and the 3d Infantry Division was to land in the vicinity of Licata. In addition to these three amphibious assault forces of the 82d Airborne Division was to conduct a vertical envelopment on D-day in the vicinity of Gela, and a floating reserve, consisting mainly of the 2d Armored Division was to be committed at the direction of the CG Seventh U.S. Army to exploit or reinforce any of the three landings.

The 2d Armored Division was split three ways for this operation: CC A was attached to the 3d Infantry Division (Task Force Dime); the 2d Armored Division (minus CC A and those units designated to remain in Africa) reinforced mainly by the 18th RCT and the 540th Combat Engineer Battalion, constituted the floating reserve (Tank Force Kool); and those units designated to remain in Africa until ordered to Sicily, consisting primarily of two battalions of the 67th Armored Regiment, the 92d Armored Field Artillery Battalion, Maintenance, Supply, Medical, and Engineer Battalions minus, and other miscellaneous troops.

Preparation

In the early part of April 1943 the 2d Armored Division was located in an assembly area at Monod, north of Rabat, Morocco. During the period April 22, 1943 to May 22, 1943 in a combination rail and motor movement the entire Division moved to an assembly area in the vicinity of Port-Aux-Poules, approximately 20 miles east of Oran, Algeria.

During the period May 16, to June 19, 1943 intensive physical hardening training was conducted which included strenuous exercises, calisthenics, obstacle courses, forced road marches, etc. All guns were test fired and tactical exercises using ball ammunition were executed.

Amphibious training utilizing the facilities of the Fifth Army Invasion Training Center at Arzew, Algeria, was conducted. This training included instruction and practical work in waterproofing vehicles, loading various types of craft and ships, and landing exercises.

Difficulty was encountered with unloading LST's and LCT's since the draft of these vessels was not suited to the gradient of the beaches in the vicinity of Arzew. Considerable lost time resulted while various unload-

ing expedients for unloading LST's, were tried out under the direction of the Navy and the Fifth Army Invasion Training Center. The final solution of unloading LST's was to use LCT's with the sides cut out and transshipping the vehicles; an unsatisfactory solution at the best, slow and laborious in a calm sea, and a most difficult task in the dark or a running sea. No comments were made by Naval personnel regarding the tonnage limitations with respect to the loading of LST's. This weight limitation proved to be a serious problem and a controversial subject in this operation.

A practice landing was conducted June 17, 1943 to June 19, 1943; this was intended to be a full-scale rehearsal. Elaborate preparations, such as wire, antitank and anti-boat obstacles, controlled troops representing the enemy, flares, blank ammunition, etc., were made along the selected beach. Strict secrecy was adhered to until the ships put out to sea. Approximately 50 per cent of the assault troops and 75 per cent of the armored vehicles participated in this exercise. Due to the lack of shipping, this exercise was executed on a relatively small scale, and although it had considerable training benefit to the participating troops, it was of limited value to the Division as a whole.

Loading

In order to more fully understand the loading of ships and crafts for this operation, enumerated below is the breakdown of the composition of Task Force Kool and those elements of the 2d Armored Division of Task Force Dime:

Task Force Kool:

18th Inf Reg Combat Team (of 1st Inf. Division)
- 32d FA Bn.
- Co. B 1st Eng. Bn.
- Co. B 1st Med. Bn.

Det. 540th Combat Eng. Bn.
2 Plats. Co. "I" 67AR
Combat Command "B" 2d Armored Division
- 3d Bn. 67AR(–)
- Co. "A" 41 A1B
- 78 AFA Bn.
- Co. "C" 82d Reconnaissance Bn.
- Co. "B" 17d Armored Eng. Bn.

82d Reconnaissance Bn. (–3 Recon. Co's)
1st Bn. 41 A1B (–Co. A)
540th Combat Eng. Bn. (–1 Bn) (Reinforced)
107th AA Bn (–)
433d AA Bn (–)
Det. 48th Armored Med. Bn.
Det. 2d Armored Division Maint. Bn.
Det. 2d Armored Division Supply Bn.
396th QM Port Bn.

Task Force Dime (2d Armored Division Units):

Hdqrs. Combat Command "A" 2d Armored Div.
66 AR
14 AFA Bn.
41st A1B (–1 Bn)
1 Co. 17th Armored Eng. Bn.
1 Co. 82d Reconnaissance Bn.
Det. 2d Armored Division Medical Bn.
Det. 2d Armored Division Maint. Bn.
Det. 2d Armored Division Supply Bn.

The general mission assigned Kool force was to sail with the assault convoy prepared to land in support of any of the assault forces. In order to accomplish this, two general plans were prepared: plan A, land on one or two beaches at which beachheads had already been established, and assemble the command prepared to operate in support of other assault forces as ordered by the Commanding General Seventh Army; plan B, force a landing on one or more designated beaches and operate in support of other assault forces as ordered. In order to be prepared to execute these plans stated above, Kool force was grouped in an assault, reserve, beach, and service echelons, and the combat loading of all ships and craft had to be executed so as to positively assure the expeditious execution of either of the two plans.

The mission of the 2d Armored Division elements of force Dime was as directed by the Commanding General of this force, generally, this mission was armored support to effect and exploit a successful landing in the vicinity of Licata.

The 23 LCI's, five LST's, and seven LCT's of Task Force Kool, and approximately 20 LST's (2d Armored Division units) of Task Force Dime were anchored in the bay of Mostaganem off Arzew. The seven liberty ships EC-2 of Task Force Kool were at berth in Oran harbor. Transport Quartermaster were appointed for each ship and craft; all TQM's were under the control of the division TQM who in turn was a staff officer under the A.C. of S. G-4, 2d Armored Division. The loading of the liberty ships was to be the most difficult. TQM's for these ships were carefully selected.

Loading of Liberty Ships

All TQM's designated for the liberty ships EC-2 worked in a special room of the Headquarters, Mediterranean Base Section (MBS) in Oran. A blueprint diagram of a liberty ship EC-2 was made available by the Transportation Section, MBS. From this scale drawing the essential ships characteristics such as number of holds and decks, capacity of each boom, length, width and height of each hold, dimensions of the Square of the hatches and the various loading obstacles were obtained. It was realized at this time that these dimensions and marine data were approximate and that no two ships are identical, and that additional installations such as blackout doors, ramps for life rafts, and extra war impedimenta, were not shown on this blueprint. However, considering the time element, and the fact that three of the selected liberty ships were still on the high seas, and those ships in Oran port were still unloading, it was decided not to have each ship measured by its respective TQM, the standard procedure, but to

accept the data of this blueprint for the templet loading plans.

The Engineer Section, MBS reproduced scale drawings of the blueprints and these were distributed to each TQM. These drawings were in three sections: bottom as hold deck, middle or tween deck, and top or superstructure deck. Insofar as could be determined, all obstructions which would interfere with the loading were inserted on these drawings. Templets to scale were constructed for each type of vehicle that was to be loaded aboard these ships and these templets were reproduced to provide an ample amount for each TQM. Each templet was marked as to what type vehicle it represented.

Each TQM was then given the complete list of vehicles, cargo, and personnel that was to be embarked on his ship and the specified combat loading priority. Due to changes in the tactical aspect of the operation this resultantly necessitated changes in the planned loading of the respective ships. If any one element is detrimental to the efficient planned stowage of ships it is the late changes which cause in the majority of cases an almost complete re-planning of the loading of the ship; a change or substitution of one type vehicle or cargo can mean the complete change of positions of all the vehicles or cargo on that ship.

The templet stowage in itself is relatively simple—it merely consists of placing the templet drawing of the designated vehicle in a position in the ship where it can be loaded, considering the capacity of the booms, dimensions of the hold, and the desired tactical priority of unloading.

The liberty ship EC-2 was decidedly not a good ship to combat load elements of an armored division; it was not even satisfactory for convoy loading of armor. The number two and number four holds (numbering forward to aft) are the only holds considering the capacity of the ship's booms which can take vehicles heavier than 10 tons. The number two hold usually has a 30-ton boom, the number four hold a 50-ton boom and the other three holds, numbers one, three and five, each have 10-ton booms. This fact is more vividly realized when one takes into consideration the small amount of vehicles in an armored division which weigh under ten tons. A loaded 2½-ton truck weighs over ten tons; this only leaves ¼-, ¾-, and 1½-ton trucks and other such vehicles that can be loaded in the number one, three, and five holds. Consequently, the bulk of the vehicles must be loaded in the number two and four holds and their capacity is quite limited, considering the capacity of the LST for heavy vehicles and the LST's relative size to the liberty ship EC-2.

The EC-2, however, was of course not constructed to transport armored divisions for amphibious landings on hostile shores; it was a cargo ship—a good cargo ship, built quickly by mass production methods and it served efficiently in this role. The EC-2 was much better suited to the 18th RCT of the 1st Infantry Division as its vehicles were for the most part the light type, requiring only a 10-ton boom. In spite of this detriment of the EC-2 it was necessary to load 2½-ton trucks (fully loaded) in the number one, three, and five holds, even though exceeding the rated capacity of the booms. The reasons for this decision were primarily, military necessity and the fact that the rated capacity of booms is usually lower than the actual lifting capacity. No booms broke as a result of this decision either during the loading or the unloading.

The templet stowage of vehicles was completed without incident, however, the planning of cargo stowage presented new difficulties. This cargo consisted of all types of supplies—gasoline, ammunition, rations and Medical, Quartermaster, Ordnance, Chemical Warfare Service, Engineer and Signal Class II and IV supplies. The EC-2's main shaft runs along the Hold deck from the engine room aft, through the number four and five holds. This creates a causeway-like obstacle which hinders vehicular loading. Due to this shaft, vehicles must be positioned on the hold deck by dexterious and vigorous application of guide lines attached to the vehicle and by driving the vehicles to the selected location. It was decided to level off this shaft with cargo to utilize this space for valuable cargo and at the same time build a platform for vehicular loading.

In all the EC-2's the number three hold tween deck had installed approximately 305 tier-type bunks which was reserved for troop space. No cargo or vehicles were loaded in this space except personal equipment of the troops being transported by that ship and this equipment was placed on the square of the hatch.

The distribution of cargo among the seven liberty ships was approximately the same in regards to type of cargo to insure supply of that type in the event of ship losses. Due to the fact that Task Force Kool was the floating reserve of the Husky operation and it was not known exactly how this force was to be employed, the cargo ships played an important part in this role and it was imperative that they be loaded in such a way that if a particular type of supply were required it could be rushed ashore in minimum time. This in brief meant that in addition to the established priority of vehicles for combat loading supplies must be readily available and not buried under a maze of vehicles. This requirement included all types of supplies, and in the case of ammunition it meant type by caliber, by guns, by shell and by fuze—for example, 105mm Howitzer, M2, HE, M48 fuze.

Since the EC-2 has only five holds and the debarkation priority of vehicles had to remain paramount, this planning requirement involved some difficulty. This problem was solved by first, templet-loading all vehicles off of the square of the hatch in order to be able to reach the Hold deck, if required, where the bulk of all supplies were loaded, and secondly, by positioning the vehicles on the Hold deck so as to not materially interfere with the unloading of supplies. With this in view, no great attempt was made to get maximum loading of supplies; the aim was maximum loading yet permitting

any type of supply to be unloaded if required.

The number two and four holds contained little cargo as these holds were needed for heavy vehicles. The superstructure deck was used, to some extent, to store small amounts of cargo, that it was known, were to be required early in the debarkation stage. Separate fuzes were stored in locked metal containers on the superstructure deck.

In the planning of this loading the distribution of weight with regards to the ship had to be considered, and for the most part gasoline and ammunition were to be loaded in separate holds. The amounts and types of cargo to be taken were decided by higher headquarters and these amounts were modified somewhat to conform to the actual characteristics of ships. The amounts and types to be allocated to each ship were determined by the Division TQM.

Finally on approximately June 21, 1943 the loading of the liberty ships commenced. Each of the appointed TQM's loaded their respective ships; no other army personnel, except loading crews were permitted aboard these ships. A large vehicle pool was established near the port area where all vehicles earmarked for the EC-2's were waterproofed and inspected. These vehicles were then separated by ship, further broken down into the hold they were to be loaded and marked with a debarkation priority. The TQM then called by phone to this pool and requested, for example, vehicles number five to 15, number two hold, for EC ship number eight (code designation). This system worked exceptionally well, the pool acted as a control point to insure the continuous flow of vehicles and prevented "piling-up" at the docks. For the most part the DUKW's and AA vehicles were loaded on the superstructure deck. Loading continued through the hours of darkness. The loading was completed in about seven days and no difficulty of any magnitude was encountered.

In the foregoing treatise considerable was written on the planning stage and little on the actual loading. This was done because by far the most difficult of any amphibious loading is the planning—if the plans are good plans the loading will be a good loading. Three liberty ships and two APA transports left Oran July 5, 1943 and arrived off Gela July 10, 1943, D-day.

Loading of LST's, LCT's and LCI's

The loading of these ships and craft took place during the period June 13, to July 5, 1943 in the bay of Mostaganem off Arzew. Most of the loading of vehicles was done during daylight hours, however the majority of personnel embarked at night.

The planning and the actual loading of these ships and craft is comparatively easy—again the templet system of fitting scale drawings of vehicles into a scaled drawing of the ship or craft was used. The LCT's carrying only about six vehicles presented no difficulty whatsoever, and the loading of the LCI's was only personnel embarkation. The loading of the LST's however, often presented minor problems such as racks on the rear of vehicles which had not been considered, and the use of a portion of the tank deck by the Navy for the storing of naval stores, again a factor not previously considered, nevertheless, small adjustments were executed and the loading was successfully accomplished. In spite of the 10-ton capacity of the ship's elevator, loaded half-tracks were loaded on the top deck. The total weight loaded aboard many of the LST's exceeded 700 tons, yet nothing was said of this fact and the effect it would have on beaching the ship. However, when the LST flotilla arrived off Tunis, the Navy suddenly demanded that the ships be limited to a maximum of 500 tons. This was highly impractical at this time and after considerable controversy the ships were allowed to proceed to Sicily as loaded.

On June 24, 1943 the LST's, LCT's and LCI's sailed from Arzew, made a rendezvous off Tunis June 27, 1943, and sailed from the Bizerte area July 8, 1943.

All plans and orders in connection with this operation were kept in a locked room under guard to which only officers classified for the purpose had access.

Unloading

On "D" day, July 10, 1943, Task Force Kool was directed to disembark at the beaches near Gela, Sicily. At this same time those elements of the Division of Task Force Dime were unloading on the beaches near Licata, Sicily.

At Gela, on receipt of orders to land, information was received from the Naval Command that LCI's were at that time in cruising formation and not the planned landing formation. It being impractical to weigh anchor, maneuver out to sea, and assume the proper formation, it was decided to disembark the 18th RCT on the LCI's from the cruising formation of the ships and reorganize troops into attack formations on the shore. This situation caused considerable delay.

When orders were received to debark Kool force, the order included a directive that the Naval Commander would designate suitable beaches in the Gela area. Certain 1st Infantry Division beaches were indicated as satisfactory and upon receipt of this information command reconnaissance parties were immediately sent ashore to make arrangements for assembly areas, routes from the beaches, and the necessary guides. Later, infomation was received from the Navy that the beaches given as satisfactory were suitable only for certain types of craft and that the bulk of the force would land at different beaches. This change was transmitted by radio to the Kool commander ashore who made the necessary readjustments, however, debarkation was delayed some two hours by this change.

Battalion commanders were then assembled on the Kool flagship and issued the debarkation orders. The 1st Bn. 41st A1B and the 18th RCT were unloaded prior to daylight on D 1. A few scattered detachments landed on the wrong beaches.

Several instances occurred which materially delayed the landing: small craft were not manned by sufficiently trained or responsible personnel. Numerous examples were noted where boats failed to come alongside in response to orders, land as directed, or return to the proper ship for reloading. There was a decided lack of central control for these small craft. The plan for debarkation of troops and vehicles contemplated the transfer of vehicle crews from troop ships to the EC-2's at sea, to permit landing vehicles with their complete crew. The EC-2's arrived almost a day behind the troop ships and as a result vehicles and crews landed separately which complicated assembly ashore. Landing operations were difficult due to the high surf that was running and the almost continuous enemy action by long-range artillery fire and enemy air activity.

By dark on July 11, 1943 all tanks of the 3d Bn, 67th AR, eight tanks of the 82d Reconnaissance Bn. and the bulk of the vehicles of the 78th AFA Bn. were ashore. During this day the beachhead was counterattacked by elements of the enemy Hermann Goering Panzer Regiment. Throughout the day several enemy bombing and strafing attacks were directed at the ships lying off Gela beaches. Several ships and craft were damaged and one LST and one liberty ship EC-2 (Robert Rowen) received direct hits and burned. The loss of these ships was a severe blow as only a few DUKWs had been unloaded, all other vehicles and cargo were lost.

One big problem in this operation was the clearing of the beaches. Supplies of all types were unloaded all along the various beaches; it took the combined efforts of all the beach groups to clear these beaches and move these supplies to inland dumps. In this task, over the soft sands of Gela beaches the so-called "DUCK" or truck, 2½-ton (DUKWs), amphibious, made its outstanding debut. This vehicle was one of the major factors for the success of this operation—it was invaluable. The operators of these vehicles were not well trained, however, they did aid materially in the unloading.

The LST's were unloaded by the utilization of Navy pontoons which formed causeways from the ramp of the LST then ran about 300 feet onto the beach. Many LST's used the LCT with the sides cut out in order to expedite the unloading. This latter method however is slow and laborious. One important detriment in the unloading of the LST's was the considerable loss of time consumed by the LST's in jockeying into position at the head of the pontoons.

The unloading of the EC-2's was done by unloading at sea into small boats, LCT's, and "Ducks." The major delay was awaiting the return of these craft and the monotonous time spent in positioning them alongside the ship under the proper boom. This unloading was too slow, the major cause was lack of centralized control of the ferrying craft; the operators of these craft were not dependable, they more or less picked out the ship they wished to unload. By approximately D + 4 all vehicles of the Division and attached troops were ashore; supplies took until about D + 10 to be completely unloaded. As soon as the vehicles were unloaded from the EC-2's, the control of these ships passed to Seventh Army.

The landing at Licata was similar in regards to unloading difficulties as for Gela. Here enemy air activity destroyed one LST of the Division.

One important point that developed in the latter action of the campaign was the lack of cargo trucks. This factor, as in Morocco, proved that in any amphibious action involving an armored division, considerable priority must be given to cargo vehicles, especially the 2½-ton truck.

Recommendations

The major recommendations in respect to the loading and unloading aspects of this operation are as follows:

(1) The liberty ship EC-2 is not suited for combat loading of armor.
(2) A definite system of centralized control for boats and craft must be established and adhered to.
(3) Boats and craft must be provided with an adequate system of communication.
(4) Beaches must be cleared early, control in regards to what type of supplies to be landed at designated beaches must be thoroughly planned.
(5) Operators of small boats and "DUCKS" must be well trained.
(6) All transports and liberty ships should have permanent naval or merchant marine personnel to function as TQM's assisted by Army personnel. The usual line officers are not capable TQM's nor can they assimilate the necessary technical knowledge in a short period.
(7) Definite regulations as to the maximum weight limitations aboard LST's must be specified in the planning stage.
(8) There is a great need for a rapid and simple method of unloading the LST's if the ship cannot beach herself.
(9) The LCT is slow and should be improved upon in regards to living conditions for military personnel.
(10) Vehicle crews and vehicles should never be separated.

Conclusions

In conclusion, the over-all results of the Sicilian campaign were a decided improvement over the African landings, yet many of the mistakes made in Africa were repeated in Sicily. It cannot be overemphasized that control is the keynote of success in amphibious landing and that three-fourths of an amphibious operation can be successfully assured by correct and conscientious planning and thorough and detailed training, especially joint Army-Navy-Air Training.

(To be concluded)

THE ARMY IN THD

(Task Force Furnace)

This firsthand report on the AGF Task Force Furnace was written from the personal observations of Major Steward, who in July, 1947, visited the task force in Arizona for the purpose of gathering material for a special Armored Cavalry Journal article.

IN the sun-baked desert of Southwestern Arizona, Army Ground Force members of Task Force Furnace this month completed their job. Since May they had been testing both men and equipment against the extreme hot weather and desert terrain.

A follow-up of Task Force Frigid, which tested men and equipment in the extreme Arctic cold at Fairbanks, Alaska, and Task Force Williwaw, which tested against cold wet weather on Adak Island in the Aleutian chain, the Army designed Furnace to test the third type of climate that would present major problems to military forces—hot and dry.

Located at Laguna Air Strip, which is 30 miles Northeast of Yuma, Arizona, and near the Colorado River, the task force had a strength of 300 men and officers and was scheduled to close its tent city by September 15.

Selected because of its hot and dry climate, Laguna Air Strip was considered by Army Ground Force experts to be the most suitable site in the United States for these particular tests.

Task Force Furnace officers have high hopes that, when tests are evaluated and final reports turned in, there will emerge improvements on tanks that may be called upon to fight in the desert at some time in the future, that the guns, clothing, and rations for desert use will be improved.

Results of preliminary tests that have not yet been evaluated in their final form, have proven satisfactory in the most part, according to Lieutenant Colonel Walter B. Richardson, Furnace commander.

"Most equipment tested here in the desert of Arizona has stood up remarkably well," says Colonel Richardson. "The tests have been well worth the Army's investment."

As to the purpose of Task Force Furnace, Colonel Richardson said, "We are looking for general serviceability of equipment and physiological effects on the men. A tank is no good if the crews can't stay in it."

Charged with testing the equipment at Furnace were test sections from three of the Army Ground Forces' four boards. AGF Boards No. 1, 2, and 3 were represented with full-time staffs.

AGF Board No. 1 test section, headed by Major Thomas J. Bishop, tested signal equipment common to artillery and airborne equipment. One item of note checked at Furnace by this board was a new and lighter type radio for forward artillery observers. This radio has an average range of about six miles, however, it actually has reached a range of 11 miles on cloudy days and nine miles at night. This Board section also tested an infra-red airborne beacon, which is visible up to about two and one-half miles.

Another Board No. 1 item tested was the Helicopter XL-13 (Bell). It underwent motor heat and weather tests to see how it is affected by high temperature and sand. So far, after tests, it operates about the same in the extreme hot weather area as it does in a temperate zone. However, because of the dust it needs a little more maintenance than normal. The Helicopter was also tested for possible use as an artillery observation plane.

Directed by Major Richard J. Grondona, the test section of AGF Board No. 2, the Armored Board, had 29 projects that it tested at Task Force Furnace. Tests conducted under this board's supervision were concerned with the general serviceability, comfort, and ability of armored vehicle crews to operate in extreme hot weather.

Armored vehicles were operated through the hottest period of the day (11 a.m. to 5 p.m.) without either men or vehicles breaking down. Crew members spent as long as five continuous hours in a tank without becoming physically exhausted.

Special tests on suspension, wheels, tracks, sights, periscopes, telescopes, compasses, and mines were conducted at Furnace by the Board No. 2 section.

Temperatures inside the tanks in the Arizona desert averaged around 125 degrees above zero in tests conducted. At this high temperature lubricants held up well. One of the problems encountered with tanks in

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★Associate Editor of the ARMORED CAVALRY JOURNAL.

DESERT

by

Major Hal D. Steward*

the tests conducted was the difficulty of working on them after they have been exposed to high temperatures for long periods. Because metal retains heat it is necessary for men to use gloves while working on the tanks. The type of glove now used is not always satisfactory because it restricts the movement of fingers in detailed mechanical work.

AGF Board No. 3 test section under the supervision of Lieutenant Colonel Clifford L. Woodliff was primarily interested in testing individual equipment and infantry weapons against the extreme heat. This Board tested about 50 items which included: food containers, mess trays, new type of Lister bag, rations, T-shirts, new combat boot, new type tropical helmet, new fatigue clothing, bath unit, mobile laundry, ice cream plant, kitchen tentage and truck, modified M-1 rifle, 60mm mortar with trigger, new 81mm mortar (with sectional tube and loose base plate that comes in two sections), new heavy machine-gun tripod with recoil mechanism, and many others.

The soldier's uniform at Task Force Furnace consisted of a T-shirt, nylon or herringbone twill trousers, and a mechanic's cap. This uniform has proven so far to be the most satisfactory for the terrific heat and sand of the desert.

As part of the soldier's "desert uniform" of the future, a new three-ounce nylon fatigue uniform and tropical cleated boots with canvas "breather" tops were tested. Some of the Furnace soldiers also tested an "airflow" tropical helmet. Shaped like a Chinese coolie's headgear, it is made of canvas and protects the back of the neck.

Oddest test items observed at Furnace were two Canadian Snowmobiles that were sent by the Canadian Army for tests in desert sand and heat. Similar in purpose only to the U.S. Army Weasel (the reconnaissance tracked vehicle that performed so well in the Arctic), these Snowmobiles are being tested as the possible solution for an all-purpose, all-weather Army vehicle.

Contrary to what many persons would think, cases of sunstroke or heat exhaustion at Furnace were nonexistent. The general health of the task force was excellent, with only about 10 per cent (normal) of the command reporting on sick call for minor illnesses and injuries. No cases of snakebite were reported in the rattlesnake and gila monster infested desert.

Scientific studies were made to determine how the hot dry climate in Arizona compared with the information already known on the effects of hot weather to men. Doctor Robert W. Clarke, a civilian physiologist, who is assigned to AGF Board No. 2 at Fort Knox, Kentucky, conducted the tests.

"Temperatures would have to go much higher in the Arizona desert climate before large-scale human physical failures would amount to anything," said Doctor Clarke.

It is also the opinion of Doctor Clarke, that marching soldiers cannot hike in the hot desert without water for more than four continuous hours. After that they would begin to stagger and fall because body fluids exhaust rapidly and dehydration proves fatal unless quickly corrected. It has been estimated by Furnace experts that the average soldier assigned to the task force drank about eight to nine quarts of fluid a day. About 90 per cent of this fluid escaped the body through normal perspiration.

Doctor Clarke also stated that, with the proper amount of fluid, tank crewmen in their vehicles could go all day under the burning sun at temperatures averaging around 115 degrees above zero without losing any great degree of efficiency. Water of a temperature about 60 degrees is considered best for drinking by persons operating in the extreme heat. As a rule, the drinking of ice water in the extreme heat is considered injurious, however, it didn't seem to have any ill effect on the Furnace soldiers. No one became ill enough from the drinking of ice water to be hospitalized.

The M-44 armored personnel carrier with a full load of men (27) might generate in two or three hours enough humidity inside the carrier from body moisture to be dangerous in extreme hot temperatures. This, however, is still just a theory.

Water for Task Force Furnace is carried in pipes above the ground from the Gila Canal, which is located about four and one-half miles from the main camp. During the day the water becomes so hot that it is impossible to use it for bathing. At times it reached a temperature of 130 degrees in the pipes. Since 95 degrees is about the normal temperature for bathing the soldiers had to wait until the water in the pipes cooled in the evening before taking a bath.

The highest air temperatures recorded at Task Force Furnace during its operations was 121 degrees above zero. However, the sand temperature at times reached near 150 degrees.

A somewhat lighter-than-standard diet has been found advisable in the heat. Experts estimate that a diet of about 2,400 calories a day per man would just about fill the bill. And this diet should consist of lots of fruits, fluids, vegetables, etc.

Experiences of Task Force Furnace soldiers will result in better ventilation for the many vehicles of the armored force, cooler tents, cooler drinking water from Lister bags made of porous material that lowers temperature by increasing evaporation, and many other improvements that will make the operations of military units more efficient in the desert wastelands that generate terrific heat.

JUNGLE FIGHTING

*by Major R. L. Templeton**

Major Templeton, a former 1st Cavalry Division officer, writes of his experiences in jungle fighting and training. In this article he offers much good advice on fighting in the jungle. "Once you start your attack, try to take all the ground you can the first day or take the complete island, because once you dig in for the night, you will have the enemy behind you as well as in front of you and will delay the attack the following morning," he counsels. Many valuable hints on military technique in the jungles are included here.

JUNGLE FIGHTING to some people is just another word, but to the millions of American soldiers, who had to spend one to three years in the tropics fighting the Japanese, because of their greed for a larger empire, that name will live with them forever, because of the hardships they had to endure and the mark it left on their bodies from one form of disease or another.

When the 1st Cavalry Division was alerted for overseas shipment in early 1943, we knew the Pacific was our destination, and tried to picture in our minds what we were in for. We could remember the movies of the beautiful islands, with clean sandy beaches and beautiful bronze girls swimming in the surf, but we knew it would only be in vain, to expect to see all of that.

We could also remember the hot summer on the Louisiana maneuvers, all of the swamps, mosquitoes, the heat. We thought then that nothing could be worse. But after reaching Oro Bay, New Guinea in December, 1943, after spending the preceding five months in camp near Brisbane, Australia, we knew we had seen the last of civilization. We saw things that we never dreamed could be so bad. First of all was the climate; we couldn't move 30 yards without being soaking wet from perspiration. Next was the mosquitoes, which were responsible for us having to stay fully dressed from daylight to bedtime. The thick growth of trees in the swamps that surrounded our area, cut off what little sea breeze that could blow our way, and our only complete rest was to put down our mosquito bars around our cots, strip off and hope a small breeze would come by.

After getting our training camp set up, our real job was just about to begin, that was spreading oil over the swamps, down small ravines to kill as many mosquitoes as possible. We found that mosquitoes could breed in the large Kuni grass field and in some areas the grass grew from nine to 12 feet in height, so that meant cutting and burning large areas. Most of the hard jobs such as that, native details would do, and we were certainly thankful, that they were on our side when jobs like that came up. We still had the job of supervision, but for cigarettes, chewing tobacco or candy, they would do anything; and it was a lot of fun trying to speak to them in their language. Before long, they took over the job of spraying the swamps for us, so we could go ahead with our training. The thing we hated most, was having to stay in uniform all of the time, except when bathing or at athletics, and at night we

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had to sleep under mosquito bars. We had to check the men during the night, to see that all mosquito bars were down, because the mosquito bar cuts off what little wind there is at night, that makes it awfully sultry and everyone knows how hard it is to stay covered up on a hot night.

Our training started with road marches of three to five miles, strip pack, through all types of terrain, and gradually increased to 10 miles with full packs and all weapons. We found that early in the morning or late in the afternoon was the best time to do anything for any length of time.

Firing mortars and machine guns on our makeshift ranges, was hard to observe from the firing positions, and the only way to do it with any accuracy was to put the observer up in a tree, behind the gun positions or up forward where he could observe the bursts. But during our training we placed our observers in trees behind the firing positions for safety precautions.

Two months after arriving in New Guinea, we were alerted to be ready to leave for our first combat by 7 A.M. the following day. We knew that was awful short notice, but by working all night we were ready and waiting. We really didn't know what to expect, but as I look at it now, it was just like playing your hardest opponent in football; you are nervous as the devil waiting for the first whistle to blow; some people wet their pants, others can bite a nail in two, but I think the majority of us did both.

In the early hours of March 4, 1944, we landed in the Admiralty Islands. The beach had already been taken three days previously by elements of our Division. After getting ashore we were certainly glad for our training we had in New Guinea, because we were now in a position only three degrees south of the Equator and plenty hot. By noon of the same day we had relieved a front-line squadron and our unit was to be the lead element of the attack in a day or so.

Our first night of combat was a night of many memories, for darkness in the Tropics comes very early, usually we started digging foxholes for the night as early as 4 P.M., because any time after 5 P.M. it starts getting dark and the Japs come out to play for keeps. The enemy learned early in the war that the American soldiers did not do any moving at night, so they felt free to do as they pleased. During the daylight hours the enemy would try to locate the positions of our machine guns and at night they would come creeping up either to throw a hand grenade or knife the gun crews. They were very tricky at the trade, for they would draw attention in one sector of our lines to make everyone start firing, and during the noise of the shooting they would slip in on our front lines or rear areas.

The Jap soldier as a whole was a good individual fighter. If he ever penetrated our lines at night he would take to the trees like a monkey, and observe what was going on behind our lines, during daylight hours, learn where the command posts were located and where our telephone lines were set up, and during the night they would cut telephone lines and knife anyone who would sleep out in the open, which it was very seldom that anyone had the nerve to do.

Our first few nights of combat we got very little sleep, because we heard so many tales of what the Japs did to the troops we relieved. It seemed to us, that as soon as darkness came the Japs took over and just walked around at will, but we soon found out that it was not as bad as it sounded, and some of us could get some sleep at night, if we could trust the other fellow to stay awake. After some time we found it better to put four men together at night instead of two, because of all the usual jungle noises, with one man awake he would be awaking the other man to show him something that was moving in the black of night; so we made it two men awake and two men asleep and it worked out much better.

In our few Banzai charges by the Japs, some occurred during the daytime, the Japs would come running and screaming toward our front lines in large groups, and would give away their positions in plenty of time for our men to man their guns, and shoot them down as they came. During the attacks the Jap soldier seemed to be doped up or drunk, because after the attack we would inspect the bodies, and some would only be armed with wooden sticks with bayonets tied on the end. We learned from actual experience, that we were fighting a man who wouldn't surrender and would stop at nothing, no matter what the odds would be against him.

In jungle fighting against the Japanese, there was no natural terrain feature you could use and say they can't penetrate, because many times, we would use an impassable stream or large swamp as flank or rear protection, and that would always be the way the enemy would come. They would float down streams in groups of four with a log as their support, and in the supposedly impassable swamps they always had a trail, even if they had to wade in it up to their armpits.

In the early part of the war in 1942, when the small American forces and Australian forces pushed the enemy back over the Owen-Stanley mountains in Southern New Guinea toward Buna on the eastern shore line, every bit of equipment had to be carried on the man or pack animal. They carried pack artillery, ammunition and some supplies. During the rainy season it made the mountain crossing twice as hard, because the only crossing was by trails which were generally cloud-capped all day long, and the mountain range rose to approximately 10,000 feet in height. Any resupplies the troops expected to get had to be by air drops. We were glad to have been able to read all this information beforehand because we were in the same predicament now, as the only supplies we could depend on now was by air, and that was three times a week with a flying fortress, with weather permitting.

The air drops didn't last long, for within our second week our supply ship with the remainder of our division arrived, and we finally got a rest and something to eat besides "K" ration. Don't get me wrong, that is a good emergency ration for a few days, but a couple of weeks of the same thing, we could hardly eat it after that.

After a couple of days rest and telling all the newcomers all of our tales of woe, we moved out to take the largest island in our group; but before we could do this we had to capture a couple of small islands to the north, so our artillery would have positions to support our landings. In taking small islands, it is much more difficult than taking a large one, because the enemy can see you approaching miles away, and that puts them completely on the alert. Usually all the small islands have coral reefs surrounding them, with only one entrance through the reef, and that is the way the enemy prepares his defense in a very excellent manner. But usually his defenses were in depth the length of the island, and not all of his gun positions could place fire close to the entrance through the coral reef, or on the beach where we had to land. That way we suffered very few casualties and always got a good foothold on the beach, before we launched our main attack. Once you start your attack, try to take all the ground you can the first day or take the complete island, because once you stop and dig in for the night, you will have the enemy behind you as well as in front of you and will delay the attack the following morning. During the nights the Japanese do a lot of movement, they infiltrate, they float logs and swim around your front lines and cause confusion and one or two snipers in your rear area can sure cause an awful lot of delay.

In taking the largest island in the Admiralty group, which was Manus, approximately 50 miles long and 20 miles wide, and having a poor road network, our division established a main supply dump for each Brigade, and we worked the island over by patrolling, from platoons up to troop strength; usually the patrols had to work at such great distances they had to take supplies to last them from one to two weeks duration.

Not knowing the country or how accurate our maps were, it was hard to estimate how long it would take a patrol to travel a known distance, because in the center of the island there was a long mountain range, which all the trails seemed to cross at one place or another. After a few days of mountain climbing we found it was just as strenuous descending the mountain as climbing it, because, it seemed to rain every day, and made the footing bad and slow, especially for the men that were carrying rations and heavy weapons, so traveling across country and on trails you could only go as fast as your slowest man could make it, and taking two to three short halts every hour. Trying to keep on the alert all the time and go up or down a slippery trail is tiresome and strenuous on men, and the only flank security you have is the men behind you in column looking out into the underbrush which is shoulder high, and that made it easy for the Japs to set up ambushes. You never know you are being ambushed until you are fired on from more than one side, and all you could do, when you could expect help real soon is to dig in and fight, otherwise you would have to withdraw and call for artillery fire to drive the enemy out, and then move on and try to catch him before he could dig in again.

We never worried about prisoners, mostly because the Japanese soldiers were instructed never to be taken alive, and we didn't care about taking them anyway; because that meant taking some of our much needed men to watch them. Along at the last of the campaign prisoners were needed so bad, that our division was offering furloughs to Australia for any prisoner taken alive, and on top of that there were very few prisoners. The prize story of the campaign was as follows: A patrol of squad strength found a starving Jap while they were returning from a patrol, and the Jap was so far gone that he couldn't walk. The men made a stretcher out of their poncho and a couple of rifles and started carrying the prisoner back, and were talking about what they were going to do in Australia on their furlough. After carrying the prisoner about six miles over slippery trails and getting him to camp where he was turned over to the S-2 for interrogation, the S-2 in turn called the medical officer over to inspect the prisoner because he was unconscious. The medical officer, after a couple minutes check, told the very happy patrol that their prisoner had died en route to camp. From that day until the men went home on rotation a year and a half later they never tried to bring in another prisoner.

On some distant patrols, it was necessary to take them by small boat to a location many miles up the shore line, where they in turn would establish a ration and ammunition dump and patrol from it. Within a specified time the boats would come back and pick them up, the patrols that went out on missions of that sort, would always have radio communication back to the Regiment for any emergency.

After the Admiralty campaign was closed and we went back to garrison duties, drilling, inspections, and training our kid replacements that were coming in, we gave two patrols a single mission, of traveling across country parallel to each other to a large hill about a mile inland. They were to establish an outpost and gain contact with each other, the old patrol leaders thought it was going to be quite simple until they started across country. After the first 30 yards, they had to start cutting their way through the underbrush and winding around to get the best footing, and also trying to maintain their direction of march and estimate how far they had traveled. After an hour and a half of cutting and wading through mud up to their knees, the patrols radioed back that they were in position but couldn't establish contact with the opposite patrol, so each patrol location was put on a map by a

team of two officers that followed each patrol, and at the critique we showed the patrols that they had only gone halfway, and were twice the distance away from each other as when they started. So that is why our patrols would follow the coast line as much as possible or well defined trails. If that hadn't been done, we would still be fighting somewhere in New Guinea or the islands thereabouts.

In September 1944, we prepared for the Philippine invasion. New equipment, vehicles and recruits arrived, but what we were wondering most, was where we were to land. En route to the Philippines we started studying the maps of Leyte, Philippine Islands, and the Island of Samoa which was cut from Leyte by a narrow channel. Every day we were briefed by the Navy or Army personnel on their knowledge of the island we were to land on, consisting mostly of the beaches we were to land on, and our objectives the first three or four days and the probable enemy we would run into.

On "D" Day, October 20, 1944, we landed in force South of the beach we were supposed to land on and after advancing inland 300 yards, we started side-slipping to the North to get in our proper position in our area. We couldn't find the main roads that were supposed to run up and down the coast line, and we later found out that the Japanese, months before our landing made the Filipinos cover the roads up, and plant grass and potatoes so the vines and leaves would cover the roads completely, in most cases it did.

"D" plus four or five we stopped advancing and everyone was quite concerned over the navy battle that was going on. We didn't know whether we were to keep fighting or go to the hills like the troops did back in 1941. But the sea battle was soon over and we started moving again and our morale was 100 per cent higher.

Fighting was much faster in the Philippines because of the road network, but they could not stand up long with all of our heavy equipment going over it. The bridges were weak from lack of repair and in most cases the bridges and roads were made for the small carts pulled by the water buffalo, so it was quite a job for the engineers to make a double-lane highway, with rice paddies on each side of the road, and in doing any repair work the dirt and rock had to be hauled a great distance to the location of work.

After progressing halfway across the island we ran into a mountain range which ran the length of the island North and South. By then we knew most of the Japs were on the West side of the mountain in the Ormoc Valley. Our G-2 reports quoted a Japanese captured field order, listing the troops, and direction of attack of their forces to drive the American forces off of the island and into the sea. So to block the probable approaches through the mountains our Division was assigned the task.

Fighting in the mountains that were cloud-capped every day of the week made it hard to get used to. At least two days out of the week the sun would shine and then it would rain the remainder of the week. We got water by catching it in our helmets or ponchos, but the days it didn't rain which were few, we had to ration our water or do without.

Our supplies and evacuation of dead and wounded was the worst problem. Our rations and ammunition could be carried by amphibious craft, the Buffalo, up to the base of the mountain where we set up a supply dump, but from there on it had to be carried by the men, crossing mountain streams holding onto a rope and then start climbing up 300- to 400-foot slopes. Then the mountain would level off and we would travel down a narrow, slippery razorback ridge, and then start climbing again. Five miles seemed to take us all day, and we were in pretty poor shape to fight after reaching what we thought was our destination.

Evacuation of the wounded was a serious problem, because it took eight men for each wounded man to be carried out on a stretcher. The men had to work in shifts, and be on guard all the time while they were traveling. The wounded would have to be tied down because the men carrying the litters were falling quite often, and they had to slide the litters down the slopes.

The men that would leave with the litters would not be able to return for a couple of days. Our dead, we would bury and evacuate the first chance we had, because the odor would make it untenable around our positions, especially when we had a chance to evacuate them.

After four to six weeks in the mountains our skin looked a very pale white and it seemed as though it was going to peel off any day. The worst part of it, we had to spend Thanksgiving in the mountains, and we knew the troops in the lowlands were eating frozen turkey. They had planned on cooking ours and sending it to us, but it would have spoiled before reaching us if they had, and if they had sent it up frozen we had no means available to cook it, so we settled for some cold "K" rations.

The Japanese tried every way possible to reinforce their troops on Leyte, but our Navy and Air Corps did such a wonderful job, all we had to worry about was the Japs actually on the island.

The Japanese artillery was short ranged but highly accurate and well emplaced. They would usually fire while our guns were firing and it gave the impression to our troops that our artillery was shooting into our own front lines. It was also true with their mortars and small-caliber weapons, and it caused quite a bit of confusion among the front-line troops until the truth was known by all.

After the fall of Leyte in December, 1944, we started reorganizing and getting equipped for what we knew was going to be the largest and toughest battle of the Philippines and that was the battle of Luzon. After being in two major engagements we were just learning how to fight in the tropics.

"The End Of The German General Staff"

by Gerd Treuhaft

IT is too early to place in their proper historical perspective the events which led to the collapse of the German Army. Not for 50 years were historians able to judge the effects of Napoleon's retreat from Russia in 1812, the collapse of the "Grand Armee," Leipzig and Waterloo.

Do not think that by mentioning Napoleon's retreat before Moscow in 1812, I intend to compare this military operation with Hitler's retreat in 1942. To compare Hitler with Napoleon would be a very great psychological mistake in our effort to re-educate the German people. It would mean elevation to the rank of "heroes" of men who were little more than criminal adventurers at the expense of the common people, men who were the most antisocial gangsters of the 20th century. Hitler and his clique took advantage of the world economic chaos which arose after the last war.

Not only did the "Revolution of Destruction," as the former President of the Danzig Senate, Hermann Rauschnigg, called the Nazi epoch, bring a whole generation destruction, but the German Army, which compared with the British or any other European Army, had the shortest but most successful tradition, was brought to moral and political disaster by the actions of criminals in its own ranks. The destruction of the Wehrmacht is certain; but some questions remain; How far did Nazism succeed in infiltrating its ideology into the 200 years old Junker caste? How was it possible that men like Gerd von Rundstedt, Manfred von Brauchitsch, Blaskowitz, von Leeb and many other professional strategists, supported a gang of political adventurers? Why was the revolt of the German generals on the 20th July, 1944, a failure? Did the military leaders of Germany realize too late the danger of the Reich's strategical position. Members of the Junker-class became not only traitors to their own ideas, but even toward their fellow members.

As I said before, it is too early to write about current events as if they were but history. A short survey of the development of the German army from 1918 to 1945 may give us some indication of the answer to these questions.

The story of the German army, from defeat to defeat, can be divided into three main chapters. First, from Versailles to Hitler. Second, from 1933 to 1939. Third, from 1939 to 1945.

The period from Versailles to Hitler has already been widely discussed in books, pamphlets and leading newspaper articles. I do not want to stress the importance of the military events inside Germany during that period, which were all, more or less, of a political nature. The names of personalities who were at that time unknown to the German and foreign public are, today, of greater interest as they have not only reappeared as commanders on various battle fronts, but some of them played an important part either in the surrender scheme of the German armed forces, or in the unsolved riddle of the Hitler plot on July 20, 1944.

The Allies thought that in view of clause 160 of the Treaty of Versailles, which said . . . "The great German General Staff and all similar organisations shall be dissolved and may not be reconstructed in any form; . . ." German militarism would not reappear again. Soon after the Treaty was signed, the old German General Staff transformed itself into various societies and student leagues like "Verein Hirschmann" or the "Ludendorf Office." Under the cover of sport clubs and civil aviation the foundation of the future "Luftwaffe" was laid. Against the Treaty of Versailles Germany formed secret schools for military science. Their first appearance in public was in connection with the Nazi putsch on November 9, 1923.

Munich became the headquarters of all nationalistic elements of Germany and of the former German division commanders of the first world war. The commander of the 7th Bavarian Division, von Lossows, had formed his own General Staff, to which Major von

Hosslein, Dollmann, Rudel, Halder, and Waver belonged. Waver became later the General Chief of the German "Luftwaffe"; and Captain Ernst Roehm, became later leader of the Storm Troops; Major Ernst, Major Meyer and Captain von Krausner played a special role inside the new General Staff. At the same time General Major Franz Ritter von Epp, with his personal adjutants, Major Hanneken and Major Huehnlein, dealt with political and special affairs inside the General Staff. Later, Major Hanneken became the Military Governor of Denmark. The survivors of the 7th Bavarian Artillery Divisional generals, Hirschauer, Zenetti, Heilingbrunner, Kieffer, Ritter von Pohl, Raithel, von Axthelm and Neuffer became the leading personalities inside the German "Luftwaffe." Only Jodl and Leeb, who served in the same regiment, stayed with the army. The commandant of one of the first infantry schools was Major General Lindemann, and his two assistants were Major General Tieschowitz von Tischowa and Colonel Leupold. Through Colonel Rossbach these three men kept close contact with the newly formed Nazi Movement in Munich. After the failure of the Nazi putsch in November, 1923, these infantry schools were moved from Munich to Dresden. At the beginning of 1926 new teachers lectured at the school. These new teachers were Major Freiherr von Weichs "Ober" Lieutenant Freiherr von Hammerstein-Equard, later chief of the German General Staff; "General-Oberst" Straus and von Kuchler, Major von Cochenhausen, later head of military science in Germany; "General-Lieutenant" Dittmar and Major Thomas. Various commanders of the German army groups, who became well known during the war, as early as 1926 gave lectures in these schools. Three of the most famous lecturers were Colonel List, Major-General von Falkenhausen and Lieutenant Schroth. The latter was one of those who took part in the attempt on Hitler's life on July 20, 1944. General Dietl and Field-marshal Rommel, were the specialists on mountain warfare.

Going back again to the years 1920 to 1923, when the Feme-mord of various "Freicorps" became a well-known weapon inside Germany against political opponents, we find another list of men who appeared later on the German General Staff, and who took a part in these actions. "Ober-Lieutenant" von Aulock, the brother of the defender of St. Male, Colonel Freiherr von Blomberg, Major Buchdrucker, Major Fedor von Bock, Captain Dietl, Captain Fromm, "Ober-Lieutenant" Faupel, Lieutenant Jaschonnek, who later became General Chief of the "Luftwaffe," Captain Ott, who later became German Ambassador in Tokyo, Major Lindemann, Major-General Ribbentrop, the father of the former Nazi Foreign Minister, "Ober-Lieutenant" Wetzell, who became the chief editor of the "Militarisches Wochenblatt." General von Schleicher and Colonel von Stulpnagel had to appear as witnesses before an Investigating Commission dealing with various Feme-mords. The assistants of General von Schleicher were General von Bredowm, who was killed with him on June 30, 1934, and "General-Lieutenant" Marcks, who died in the Normandie fire, and Generals Manstein and Lindemann. The late "General-Oberst" Rudel, flak specialist, and Count Sponek, specialist of the airborne troops, were two less well-known members of the German War Office. Long before Hitler came to power in Germany, in a certain "Schlieffen League," members of the former General Staff lectured in special courses on science of modern warfare. General Guderian lectured on tanks; Nehring on antitank weapons; and Fellgiebel on the corps of signals service in wartime—later he played a doubtful role in the anti-Hitler plot in 1944.

Second Period of Decline

Before dealing with the second period of the decline of the German General Staff (from 1933 to 1939), I want to stress another breach of the Treaty of Versailles which received less notice inside and outside Germany—it is the article 179 of the Treaty which clearly stated that no German citizen was to be allowed to serve in any foreign army except in the French Foreign Legion.

Shortly after the end of the first World War a Japanese Military Commission visited Germany to engage military contractors for the Japanese army. In addition, South America, North Africa and China became the training ground for the ex-members of the German General Staff. Not only was North Africa of vital military importance for the German General Staff, but the German officers were interested in the raw materials which they found on the new battle ground. Under two former members of the Ludendorff Office, Colonels Nicolai and Bauer and Captain Damnitz and Lieutenant Ehlermann, the Germans took an active part in guerrilla warfare against French occupation between Tibu and Cameroon. In the well-known Abd-El-Crime revolt against the Spanish Government, "Ober-Lieutenant" von Scheele took an active part. The same German officer was in charge of the first German troop transport to help Franco against the Spanish Government. The German High Command paid special attention to the developments in South America. General Faupel, who later became German Ambassador in Madrid, was before 1914 a Major at the Argentine Military Academy. After the failure of the Kapp-Putsch, Faupel returned to Argentine. During the operation in the Gran-Chaco conflict, Major-General Hans Kundt became an important member of the Bolivian General Staff, together with Captain Ernest Roehm.

Professor Hugo Fernandez Artucio, professor of Philosophy at the University of Montiviedeo, gave the following list of members of the German High Command who were in Argentine: Commander General Gunther Niederfuhr, Commander Major Otto Kriesche, Chief of the General Staff, Major Victor Schubert, in charge of the Technical Department of the

Army, Major Walter van Stecher, and in charge of sea and air operations was Captain Dietrich von Niebuhr.

The next field of operation for German officers was China. Hitler's personal pilot, Ritter von Greim, was instructor at the Air Academy in China. Here again we find former members of General Ludendorft's staff. Colonel Kriebel was in charge of the illegal distribution of munitions. Colonel Bauer, head of a German Military Commission, tried to reorganize Chiang-Kai-Shek's army. The man who was Governor-General of Belgium and North France during the second World War, Colonel General Alexander Ernst Alfred von Falkenhausen, played an important part in China's struggle against Japan till 1938. In the German army's process of penetration inside foreign armies, the "Luftwaffe" took an important role. Long before Franco became the Caudillo of Spain, General Faupel and Haushofer, and the former Director of the German "Lufthansa," later Field Marshal Milch, were working for the spread of influence in Spain which was to become a tool in Germany's forthcoming conquest of South America. In 1930, tourist planes were going to Madrid and Barcelona three times a week. A certain Count Beroldingen organized a special exchange between the "Lufthansa" and the Italian Fascist Air Society, "Ala Littoria." Together they prepared the strategical plans for a supply route to Spanish Morocco, which came into action in July 1936, when Franco, with German and Italian help, began his revolt. These events were among the first fruits of Hitler's Chancellorship.

The second period of the destruction of the German General Staff can be summed up into three specified dates.

The first event was on June 30, 1934, the well-known "night of the long knives"; the second February 4, 1938; and third, shortly following the first military occupation of Austria on March 11, 1938.

The exact role of the Reichswehr in the rise of the Nazi party to power is still a controversial question. Unlike General von Seekt or General von Schleicher, none of the Reichswehr leaders had political aspirations, not even General von Fritsch, who in February, 1934, took over the Heeresleitung from the despondent Hammerstein. Fritsch was known in the army as a particularly close disciple of General von Seekt. The Generals were only too satisfied to leave the work of political reconstruction to the Nazis, assuming that they would always have the power to interfere whenever necessary. It was a most dangerous delusion, and it left them with nothing to fall back upon if the abuses of the new regime outweighed its usefulness.

The first victory of the German General Staff over the S.A. (Storm Troop) ended in the blood purge on June 30, 1934. Captain Roehm's ambition to use the S.A. as the foundation on which to extend the armed forces presented an obstacle. Had Roehm been willing to work under von Beck, who was at that time chief of the German General Staff, Beck would have taken him on at once. What disturbed Beck and the rest of the General Staff was that this gifted militarist wanted to organize a gang of assassins and that he preferred such an organized gang to the army.

The pyrrhic victory of the General Staff over the S.A. was only a temporary one. Ten years later, on October 1, 1944, Himmler abolished paragraph 26 of the German Army Law, which stated–"That no member of the Wehrmacht is allowed to belong to any political organization."

Hitler Alliance With Army

In 1934, Hitler decided to sacrifice the radicals and make an alliance with the army. It sounds like historical irony that the men who supported the purge in 1934 became, 10 years later, the victims of an idea which they thought to have stamped out during the blood purge in 1934.

Political and military events inside and outside Germany might have taken quite a different course if the plans of General Schleicher, who had supported Captain Roehm's idea of creating a peoples army by incorporating the S.A. into the Reichswehr, had succeeded. During this June crisis of 1934, two mysterious foreign powers, also supported Roehm's plan. As I was in close contact with the Austrian Embassy, which, at that time, was situated next to the German War Office, I learned that Italy and Hungary had given the S.A. their moral support. After the complete failure of their plans, the Italian Ambassador, Cerruti, was transferred from Berlin to Paris.

With the death of the German Reichspresident, General-Field Marshal von Hindenburg, four weeks after the June purge, the German General Staff lost their first advantage by accepting Hitler as the supreme leader of the armed forces and by swearing a personal oath of allegiance to him. The General Staff surrendered the political control to the Nazis in return for autonomy in their own sphere; and during the next three years, from 1934 to 1937, von Fritsch methodically organized the ground he had won by exchanging the political control for autonomy in the development of the Reichswehr. He arranged that the Nazis should be excluded, as far as possible, from the command in the new army. Instead, he called upon the officers of the old imperial army, who under the republic, had swelled the ranks of the Steel Helmets and other organizations.

Hitler was not long in sensing danger to his regime in the maneuvers of von Fritsch and other reactionary Generals. He did not intend to fall into the same error as the Republicans, who could not free themselves in time for the bondage of the Reichswehr. Since the army had driven out Captain Roehm, it had become too strong, and had to be weakened.

The marriage of the German Minister for War, Field Marshal von Blomberg, to Fraulein Eva Grun, a typist in the War Office, and his resignation from his post for health reasons, gave Hitler a splendid opportunity of discrediting the Marshal in the eyes of the

reactionary elements of the High Command. Himmler had already collected a secret dossier about the past of Eva Grun. The Division R.W. (Reiswehr) of the Gestapo, which since February, 1934, had been engaged in close investigations of the private lives of all German generals and other high officers, had known that Field Marshal von Blomberg was associated with a young woman. As soon as General von Fritsch saw the dossier, which had been secretly sent to him, he called for an important conference at the War Office of all commanders of military districts in the Reich. The following list of these commanders is of great interest, as the names of some of the men concerned appeared in connection with the Hitler plot on July 20, 1944, or some of them played an important part in the second World War. The meeting opened in the conference room of the German War Office. Herr von Fritsch presided. In addition to him and to Chief of Staff Beck, the following Generals were present: Generals von Rundstedt, Ritter von Leeb, von Beck, von Brauchitsch, von Kuechler, Blaskowitz, List, Geyer, von Kluge, von Reichenau, von Kleist, Dollmann, Knochenhauer, Ylex, Kress von Kressenstein, Weichs, Lutz, and Major Alfred Jodl, who acted as receptionist—however he must have found way to get in on the last part of the meeting.

Fritsch accused Blomberg, at the conference, of having become too soft. As I said before, Fritsch wanted to eliminate the influence of the Party and the Party members in the army. Therefore, Blomberg, who had been given the nickname, "Hitler-Junge Quex," must go. Further, the struggle for the Luftwaffe between Goering and Fritsch, had been raging behind the scenes since 1935. Hitler and Goering wanted to retain control of the Air Force, and General Fritsch saw no reason why the Luftwaffe should be commanded as a separate unit from the Army.

After various interviews between Hitler and Fritsch, and the exchange of various memoranda between the General Staff and Hitler, the real dividing line between the army and Hitler was marked on February 4, 1938, with the dismissal of Fritsch. Six months later General Beck, Chief of the General Staff and next to Fritsch, leader of the opposition, left after the Munich crisis because he had not been able to have an order enforced forbidding officers on active service to be members of the Nazi party. General Brauchitsch replaced von Blomberg, and General Halder replaced Beck as Chief of Staff.

The General Staff protested vigorously, four weeks later, over Hitler's decision to go into Austria. But once again Hitler said, as in the case of the reoccupation of the Rhineland, 1936, to the German General Staff—"Gentlemen, it is your business to take the action I direct. It is my business to direct only action which will be successful. I can assure you now, as I assured you on the reoccupation of the Rhineland, that this time France will not move, the British will not move; we can do as we like. . . ." Hitler was right again, and with two major victories to his credit, he could face his generals with an even more momentous and critical order —to occupy Czechoslovakia.

This above paragraph gives us an answer to the question recently asked by the American newspaper reporter, H. R. Knickerbocker—"How is it that this man (Hitler), who was only a corporal in the last war, could suddenly obtain such an ascendancy over the German Army and in particular the General Staff?"

After the first purge of the Wehrmacht in February, 1938, German propaganda gave out that this was done to purify the German army from political partisanship and make it an instrument of the State. But in spite of the differences between the General Staff and the Nazi party, the amalgamation of the army into the Third Reich was completed by September 3, 1939.

Ousted Generals Return

The ousted generals returned to their posts at the outbreak of the second World War and after the successful campaigns in France and in the Balkans, even such skeptics as von Bock and von Leeb began to share in the general belief in Hitler's star. For a short period from 1939 until 1941, a certain collaboration between the army and party became visible. Then, after the complete failure of the German offensive against Russia, old doubts were revived. Hitler removed von Brauchitsch from the army, made himself commander on the Russian Front, and started a new summer offensive against Russia in 1942. The offensive ended as disastrously as that in 1941.

Now, the generals did not hesitate to stress at every opportunity that the whole responsibility for the conduct of the war was Hitler's, as Supreme Commander of the army in the field. The result was that more and more generals were deprived of their commands. To the name of Brauchitsch were added the names of von Bock, von Leeb, von Kleist, von Witzleben, von Kuchler, von Manstein, Halder and many others. The successful opening of a second front in Normandy cost von Rundstedt his command, and the allied victories in Italy put an end to Kesselring's career.

W. E. Hart mentioned in his article on "The Revolt of the Generals" two possibilities on which the German General Staff were relying before the opening of the second front. They were: 1. A split between Britain and America on the one hand and Russia on the other over postwar planning, and more important—the immediate coordination of strategy during the second World War. 2. That the Russian communication and Army Service Corps would fail to carry on over twice scorched earth, and thus be unable to supply properly the advancing field units.

The answer to the first possibility was given in the perfectly synchronized operation in the East and West. The answer to the second was written on the wall by the advance of the Red Army.

The first signs of a complete break between a certain circle inside the General Staff and the Nazi Party now

became visible. As early as 1943 a group of generals headed by Halder, Bock and Manstein and supported by Goering and Ribbentrop attempted to put pressure on Hitler to conclude peace with Russia. They were met, however, with a flat refusal from Hitler, who regarded the war in the East a matter of personal prestige and it was another year before the question cropped up again. Now, the General Staff could no longer maintain their years-long attitude of "wait and see." The war on three fronts and the heavy defeats on the Russian front proved that the generals, who Hitler dismissed after their failure to take Moscow, were right and Hitler was wrong.

On July 10, 1944, the commander of "Heeresgruppe" north, recommended a retreat of about 30 divisions who were encircled in the Crimea. On July 13, 1944, Hitler ordered General Lindemann, who was in charge of the German Northern armies to counterattack. Lindemann refused. At the same time Adam von Trott, one of the leading figures in the army plot in July, 1944, returned from a secret mission from Sweden. At the end of June, 1944, von Trott went to Stockholm to get in touch with the allies, to ask them whether the Allies would maintain their demand for unconditional surrender by a government succeeding Hitler after a revolt in Germany; second, whether the allies would be willing to allow such a provisional government a certain freedom of action to enable it to stabilize itself before the allied occupation.

According to the "Dagens Nyheter" newspaper, the Allies were suspicious of these approaches and told von Trott that the German opposition must first achieve something before subsequent action could be discussed.

Three weeks after von Trott's return from Stockholm, the German General Staff tried to play its last card for its own survival, in the attempt on Hitler's life. With the failure of the generals to kill Hitler and his gang, the greatest army purge in German history swept over the whole of Germany. Here are the names of the high officers of the Wehrmacht who took an active part in preparing the attempt against Hitler. Field Marshal Erwin von Witzleben, former German commander in France and Italy; General of the Signal Corps Fellgiebel; General Friedrich Olbricht, second in command of the Home Army, who held all the threads of the conspiracy in his hands; Colonel-General Erich Hoeppner, who was expelled from the Wehrmacht at the end of 1941 for his retreat on the Eastern front; Colonel-General Ludwig Beck, Chief of Staff until 1938; Lieutenant-General von Hase; Major General Stieff; Major General von Treschkow; Colonel G. Hansen; Lieutenant-Colonel G. Bernardis; Major G. Hayessen; Captain Klausing; Lieutenant Count von der Schulenburg; Lieutenant D. R. von Hagen; and Count York von Warthenburg. The following who were shot under sentence of court-martial on July 20, were also expelled from the army, together with the abovementioned officers: General of the Infantry Olbricht; Colonel Count Stauffenberg; Colonel Mertz von Quirnheim, and Lieutenant Haeften. More than 2,300 officers were murdered between July 20, and August 1, 1944.

The names given above are among those which appeared in the first part of my article, in connection with the various Freicorps, and the secret rebuilding of the German General Staff between the years of 1918 and 1933.

July 20, 1944, brought an end to the old military aristocracy, the generals of the traditional Prussian order. The best brains of the Germany army leadership; Generals Rundstedt, Beck, Brauchitsch, Halder, List, Leeb, and many others knew that the war was lost, nine months before the unconditional surrender terms were signed. Nevertheless, a new selection of officers appeared on the military horizon in Germany. The new Chief of the General Staff was Colonel-General Kurt Guderian. Guderian represented the fusion of the Army and Party of the Wehrmacht and S.S. Black Guards. Shortly after July 20, 1944, Goebbels gave Guderian as much publicity as he had allowed Rommel. As far back as 1940, he called the tank expert "Father of the Panzer Division."

The next figure in the aristocracy of Nazi selection was the 53-year-old Field Marshal Walter Model. He was the first of the few high German officers to assure Hitler of his allegiance after the July plot. The Nazi leaders clearly considered him, the natural successor to Rommel, as the most reliable Nazi among the commanders after the army purge. These two army commanders were given great publicity during the last six months of the war.

The following two generals are less known to the public, and therefore their steps should be closely watched, after their release from prisoner of war camp. General Hermann Balck is comparatively unknown. He was one of the commanders at the break-through army at Sedan in 1940, but from then on was entirely concerned with the war in the East. More well known to the commanders of the 21st army group was General Gustav von Zangen. Von Zangen commanded the defense of Antwerp. Another Nazi-minded general was von Kuechler, who took over from Leeb the command of the Leningrad front.

Thus, the twilight of the old Prussian General Staff was followed by the dawn of a new aristocracy of Nazi generals. If these Nazi generals can successfully disappear from the limelight until things have blown over, we can be sure, that in ten, fifteen, or perhaps 20 years' time, their names will reappear on some world battlefront. It is for this reason that I have paid special attention to the names of various Nazi generals in this article. Between 1918 and 1939 we neglected the advice of unknown army commanders of the first World War. If we are going to neglect the movements of former Nazi commanders, it may be the embryo Nazi general staff of the second World War that draws us into the third World War, which will bring the end of civilization.

German Assault Artillery

Manfred Knayer, a graduate engineer and a World War II German soldier spent the terrible winter of 1941-42 with the German Army near Moscow. After the collapse of the Nazi Army, Knayer discharged himself and walked 400 miles to reach his home. Currently he is employed in Germany as an interpreter. Since 1939 he has been writing magazine articles on motor, flying and military subjects.

*by Manfred Knayer**

AMONG the several dozens of armored fighting vehicles brought into fight by Germany, there was an outstanding type which kept its value almost unchanged from the beginning to the end of this war. It was the Sturmgeschuetz, the assault gun.

Being a relative to the tank—they even could replace one another—it is not easy to explain clearly the difference between them. Generally, the tanks were to break *through* the enemy lines, pushing far behind the front, and to fight independently, in great actions.

The assault artillery was to break *into* the enemy defense system and to help the infantry directly by close support. They took part also in smaller actions. Unlike the armored artillery, they advanced with the first infantry lines.

The first model was a three-inch gun behind a steel shield on a caterpillar chassis. They soon were replaced by an all-armored construction of such excellent qualities that not many changes had to be made.

The principal distinguishing mark was: No turret. The vehicle was a successful conversion of the German medium tank Mark III. The short 75mm cannon (three inches), 24 calibers long, was placed in the middle of the front like a bowsprit. Compared with the tanks of 1939, armed with thin one and one-half and two inch semi-automatics, these shells of 12 pounds were a respectable caliber. The initial speed was relatively small, and in 1942, it was insufficient against Russia's heavy tanks. So the short cannon was replaced by a long barrelled one of double the length, which was able to destroy other tanks in distances of over a mile, not seldom by shooting off their turrets. The overweight of the barrel was compensated by springs, the increased recoil partially was diminished by a muzzle brake.

The missing of a turret resulted in a limited ability to turn the cannon. This disadvantage was not too great. A clever driver turned his whole vehicle almost as quickly as a tank his turret. On the other hand, the construction could be made more compact and more resistible against fire. The weight of the non-existing turret was used to strengthen the armor. It was at the front about two inches, later the double, all welded, sometimes still fortified by a bow tie of suspended spare track links. The flanks later were additionally hooded by so-called armor aprons, about one-half inch thick, against the new high explosive shells piercing the armor not by speed but by detonation. Thus the main armor was protected against this effect. It also was said that these pending plates helped to stop other projectiles by a sort of relaxing resistance. Sometimes they got lost; for repairs of the tracks, they were in the way, but under fire, they were quite useful.

The undercarriage, about 10 feet broad, 24 ft long, rested through torsion springs on six bogies of each side. The first and last crank was connected with an oil filled shock absorber. This gave a smooth running, and wounded often preferred a returning assault gun to an ambulance.

*German Graduate Engineer.

A 12-cylinder motor of 300 HP permitted a speed up to 25 m.p.h. driving a gear of six forwards and one backwards speeds, followed by a planetoid steering gear. The skeleton tracks, one foot four inches broad, often ran 1000 miles without any casualty.

The crew, four men, called cannoneers, mostly came from other artillery outfits and thus already had been trained to an exact work with guns and where they had got an artilleristic view of the problems. There was the driver, sitting at the left, behind him the aiming (training) cannoneer, then the gun commander, ranking from a corporal up to a captain, and at the right, the loading cannoneer, also operating the 20 watt short-wave station. All members were connected by the interphone.

The observation means were good. The driver observed through a glass armored slit with a variable shutter, besides he could use a binocular, of small enlargement, but of a good field of view, with very small entrance lenses. The gunner aimed through a panoramic telescope. There was the possibility to non-direct shooting, but this mostly was restricted to the other armored artillery units. The commander observed through a 12-power scissor-shaped telescope, looking out of the armor roof like a stalk-eyed snail, besides his normal field glass, which both brought objects very near to him. The want of a small all-round observation turret was in evidence already in 1940, but it lasted almost three years until the improved type got such an eight cornered mirror equipped observation stand.

It was similar with the additional light machine gun. Its necessity for an assault gun had already been mentioned in Heigl's manual of tanks, printed in Munich, issue 1930, but it appeared only in 1943. As in all other tank, the heat sometimes climbed up to over 140° F. Despite these smaller faults, the German assault gun is to be called a successful construction, and it was continuously improved, especially during the terrible winter 1941-1942.

The units of the assault artillery were batteries, consisting each of three platoons, each of six guns. To each gun belonged a half-track ammo carrier, with a trailer, and equipped with a short-wave receiver. The batteries were united in sections and generally assigned to an army or to a division. There were also some special outfits, as the divisions "Hermann Goering", or "Greater Germany" possessing even assault artillery brigades.

The tactical use of the assault artillery gave many chances to faults and mistakes. Many guns were lost on account of insufficient experience or wrong use. When fighting according to their abilities, with deliberate boldness, they were of a high value.

They were a weapon for attack, and sent to the focus of the battle, to the center of gravity in the fight. They were able to break strongest resistance. They had to help the attacking infantry outfits and were assigned or subordered to them, sometimes for a longer time, mostly from battle to battle.

During the battle, they used to choose their targets themselves and there was no lack of them. First they used to fight their worst adversaries, antitank guns, and tanks. Then they took under fire objects stopping the infantry, which had or could not be destroyed by the artillery: Machine guns, pillboxes, infantry howitzers, trench-mortars, blockhouses, also counterattacking infantry, but that was better left to the accompanying riflemen. In case there was too strong a fire barrage, they sometimes independently drove to the enemy artillery positions if there were no tanks to do so. Even gunboats and ferries were sunk by such assault guns.

As a rule, the gun stopped for firing, going into "firing position" behind a ridge or some trees, bushes or other kinds of cover, even in a barn. Mostly, the driver switched in an advance or reverse speed, with idling clutch ready to advance or retire at once. Sometimes, the commander got out to lead and observe the fire from the gun's flank.

In close fight, the gun could knock down houses and trees including the snipers sitting on them, and roll down barbed wire, guns, and kill men in dugouts by waltzing on them.

Very often, the infantry asked for help against certain targets giving them trouble or which had not been discovered by the cannoneers behind their armor slits. The riflemen could call it to the gun or send a message runner or fire some flares or tracers in direction of that object. The use of wireless for connection had been the best, but it was seldom used. The infantry wavelength did not match their sets, and as many Armies, also the German Army had a certain rate of mental clumsiness.

A clever infantry used to assist such a friend. They used to clear its way from mines and took discovered antitank guns under fire. With spade and pickaxe they lent him a hand to get over tank traps and obstacles and warned him of unpassable mud puddles. They had to protect the gun against getting attacked from the rear by tank crackers.

This joint fighting of infantry and assault artillery demanded thorough preparations. The infantry had to be trained for it. At least before going into an action, it had to be talked over: Ground, enemy, important targets, supply. Very often the infantry commander had no idea how to use these machines, and it could happen that the gun commander refused to do a certain task—if he was of a similar rank. A petty corporal had to try the impossible and to die for Greater Germany.

Such mistakes happened often enough. The infantry captains thought such an elephant could do all kinds of work. But he was not able to pass through swamps —the Russians had a lot of them—nor were they qualified to mop out brushwood territory. To send them into a village without skirmishers, in most cases was equal to a loss of them, by mines or armor crackers. They could hold a position but for short time and soon they were to be relieved by other units.

In defense, the only thing they could do was to

counterattack. To retreat under fire was a dangerous affair. The gun was not able to shoot backwards, and the rear armor was thin. Retreat had to be done using the reverse speed and artificial fog. To dig in a tank up to his chin, as often done by the Russians, is proper only for tanks with a turret. In any case, at least two guns had to cooperate, better more.

The moral effect of these guns, their encouraging impression can be judged only by participants in such a fight. The infantry always was glad to see them and trusted much in them. Always taking care of the doughboys, they were appreciated by them much more than the tanks. It happened that guns, having spent their last round, used to cross near the first lines, to keep up the morale of the infantry. Such a sacrifice is to be acknowledged, but in case such a gun gets hit and breaks down, and burns, the following depression will be worse than the encouragement it caused before.

Towards the end of World War II, on the German side, all was mingled up in a great confusion. Tanks and tank destroyers had to do assault artillery tasks and vice versa, which diminished the value of them at a high rate and is to be considered as a stop gap remedy of limited use.

The idea of the assault artillery is of French origin, apart from some sketchlike proposals of older dates. England developed the tank from the side of the navy, and after the great success at Cambrai, was pleading for the independent use of armored vehicles in great masses. In France, Colonel Estienne had suggested armored motor guns able to go cross country, for close support to the infantry. The tanks even were called "artillerie d'assault" for some time. But in all armies, the use of tanks in smaller numbers and for smaller actions was considered to be not commendable.

The stout German assault gun opened a new period for the armored forces. It carried a gun and an armor as strong as the often discussed French heavy char de rupture 3-C at one third of its weight. Many copies and imitations appeared, all of them conversions of a medium or heavy tank.

Italy built a three inch gun in the medium Ansaldo tank. Hungary changed the Skoda tank of Czech origin into a four inch (105mm) armored howitzer. Similar things went on Allied side. The chassis of the Grant-Lee-Sherman series was used to carry a 105mm and even a 155mm gun. Soviet Russia did not stay back in the evolution. Their famous swift T-34, originally armed with a 76.2mm cannon 30.5 caliber long also was built as an all-armored samochadnaja ustanovka—a self propelled carriage armed with an 85mm cannon, 51.5 caliber long, or with a 122mm howitzer, 22.7 caliber long. The KW-II, 52 tons, abandoned its clumsy square tower with a 152mm short gun and became the SU-152 with a 152mm cannon L-29 in its slanted front plate, almost three inches thick. The ship was only three yards high instead of the four yards of her predecessor. An assault gun with an eight inch howitzer is said to have appeared. These guns really could give hell to the Germans.

The Germans themselves constructed several similar war machines. Part of them were called and used as tank hunters or destroyers. The original vehicle could be armed with the regular 105mm field howitzer. Then came the six inch storm howitzer on the chassis of the medium Panzer IV, the six inch infantry gun on skoda chassis, eight and one-half inch mortar and even a 15 inch mortar on Mark VI (Geiger) body firing a rocket propulsed projectile of terrible effect. Professor Porsche, the creator of the volkswagen, constructed an almost invulnerable tank destroyer of 70 tons with an 88 piece 71 caliber long in a rear fixed tower. It was easy to govern on account of the electric power transmission.

There were perhaps too great a number of types, and improved and converted and altered types and subtypes. However, the total number was not great enough to make Germany win the war.

The evolution of tanks and antitank weapons will go on, though not so fast as in war times. The armored fighting vehicles will have to get armed and armored stronger and stronger and thus the tank perhaps may be displaced by the robust assault gun.

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Logistical Coordination In Burma

(October 1944 - May 1945)

by Lieutenant Colonel Robert A. O'Brien, Jr.

The success of the Burma Campaign was the result of sweat and blood on the part of the front-line soldier, but even so, it could not have been brought about without the wholehearted support, untiring superhuman efforts and unparalleled cooperation of the men all along the line of supply. Colonel O'Brien tells the supply story here.

GENERAL JOSEPH W. STILWELL'S troops had knifed, hacked and punched their way through the Hukawng and Mogaung Valleys in Northern Burma, had retaken Myitkyina[1] on the Irrawaddy in hand to hand combat. They were now in the process of building up, preparatory to debouching into Central Burma, with the mission of recapturing Central Burma as far South as Lashio, and of clearing the trace of the Burma Road[2] thereby re-establishing Allied control thereon. It was a campaign against the battle-tried and jungle-wise Japs, many of whom had seen action in the conquest of Singapore and the Malay Peninsula in February 1942. "Marching over the most difficult terrain under intolerable weather conditions, the Chinese and American forces virtually destroyed the Japanese 18th Division, which had captured Singapore in the Japanese advance."[3] Myriads of insects of numberless species, tropical diseases hitherto known to only a few white men ("The jungles that cover the barrier of the Himalayan foothills are malari-ridden, infested with acute dysenteries and endemic typhus"[4]) and adverse weather conditions were not the only obstacles that confronted General Stilwell (later Lt. Gen. Dan I. Sultan) and their forces.

They faced the most difficult logistical battle of our time and possibly of history. In the words of our then Chief of Staff, General of the Army George C. Marshall, "The mission that the joint Chiefs of Staff had given General Stilwell in Asia was one of the most difficult of the War. He was out at the end of the thinnest supply line of all; the demands of the war in Europe and the Pacific campaign, which were clearly the most vital victory, exceeded our resources in many items of material and equipment and all but absorbed everything else we had. General Stilwell could have only what was

[1]Myitkyina, on the Northernmost tip of the Burma Railway, was the key to the whole Burma campaign. Here was the first available site South of Ledo, Assam, capable of being developed into a base that could support a major offensive. It later became a sub-depot for Advance Section, whose Headquarters were at Ledo, was the site of four major airfields (subsequently developed for B-29 operations and A.T.C. bases for air supply of China), the terminal for a four-inch and a six-inch pipeline, the site of the largest bridge over the Irrawaddy North of Mandalay and the head of the Burma Railway. Naturally American and Chinese Headquarters were located here at the beginning of the campaign.

[2]A great tribute to Chinese resourcefulness, constructed largely by hand labor a few years previous, after the Japanese had effected the blockade of all the major East China ports.

[3]General Marshall's Report, *The Winning of the War in Europe and the Pacific*. p. 58.

[4]*Ibid.*, p. 57.

left and that was extremely thin. He had a most difficult physical problem of great distances, almost impassable terrain, widespread disease and unfavorable climate; he faced an extremely difficult political problem and his purely military problem of opposing large numbers of enemy with few resources was unmatched in any theater."[5]

The battle could be won only if superhuman efforts were made by all concerned, and by exploiting to the utmost all the ingenuity and resourcefulness the theater could muster. These were the "dog days" when the only answer to the question "Will we win the war?" was, "we'll dig, dig, dig and do our best." So far none of us had any conception of the new shortcuts to rapid ending of the hostilities, such as the Atomic Bomb. Neither had we any idea of Russian participation in the war against Japan, for frankly the Germans were giving us fits on the European front. We had to dig, and dig deep; the outcome still hung in the balance. The situation at this time was roughly this: the theater (both C.B.I.[6] and S.E.A.C.[7]) was very low on the priority list established by the Joint Chiefs of Staff; supplies had to come some 11,000 miles by ship through enemy infested waters to reach ports in India;[8] and the fighting forces were an additional 1500 miles distant over narrow gauge railroad, twisting rivers, high mountains and jungle trails. The allied shipping shortage at the time, together with the shortage of major items, especially transportation equipment and transport airplanes, were the source of great anxiety to the theater commanders and their staffs, not to mention the down front soldier who had to hold his equipment together with all the improvisations and prayers available.[9] A partial sense of security was obtained, however, from the great contribution to the Allied cause made by the Government of India. The procurement of supplies locally, materially enhanced allied chances for success. Principal items furnished through local purchasing and contracting and by the Government of India were: gas, oil, and other petroleum products, including containers, food for rear area troops and Chinese forces, clothing for Chinese troops, parachutes for supply dropping missions, packing and crating materials, tentage, blankets and office supplies. Major services performed were labor for construction, and rail and water transportation (although the U.S. Army assisted these latter services to increase their capacities tremendously). The services can, with minor exceptions, be lumped together under engineer and transportation services.

The over-all plan for recapture of Burma (Plan Capital) involved a three pronged attack on the Jap concentrations there (in the main the 18th, 15th, 31st and 33d Divisions): one force, composed mainly of the British 11th Army Group, 14th Army and 15th Corps was to move down Western Burma and the coastal area toward Mandalay, Rangoon and eventually to Singapore. The Chinese-American force (Stilwell's force) known as Northern Combat Area Command and the Chinese Army in India was to move through Central Burma, from Myitkyina, in the direction of Lashio and Mandalay. The third force, commonly known in the theater as the "Y" Force, composed entirely of Chinese under command of Marshal Wei Li Haung, with American advisors attached, was to move southwest over the old Burma Road to the China-Burma border to join Stilwell there at the border town of Wanting. This then was the grand strategy. I will limit my discussion to the problems of the Chinese-American force (N.C.A.C.)[10] inasmuch as this force was of more vital concern to the United States Army Forces, China-Burma-India. Once the mission of Stilwell's Army was accomplished, the completion of the road to China could be undertaken and the overland supply route to China would become a reality.

Terrain Estimate

To appreciate the problem confronting the supply "wallahs"[11] a general knowlege of the terrain is essential. The best and quickest way to obtain an estimate is to accompany me on a ride in a war weary C-47 of the Tenth Air Force from Dinjan Airfield (or Moran or Ledo) in Assam (Northeast India) to deliver a load of rations, horseshoes, bitumen or other precious cargo to the needy combat troops deep in Central Burma. If you look out here where the door to the cargo compartment has been removed, you get a better and more complete view of the formation of the earth. You will no doubt be overawed by the primeval forests, beautifully wooded, snow-capped, rugged mountains, gorgeous cloud formations and indescribable sunsets and sunrises. You might even imagine you see ancient predatory beasts (actually you will see tigers and elephants when we fly low). Yes, those giant trees below are mahogany (imagine using mahogany for every day construction of bridges and camps). But remember we are up here to get an eagle's eye picture of the terrain as it affects the more realistic though less glamorous subject of logistics. I will point out the geological feature with the greatest effect on our mission. The G-4, A-4, and S-4 mission is to obtain and provide ample supplies of food, ammunition, gasoline, replacement equipment, airplanes,

[5] Marshall, *op. cit.*, p. 59.

[6] China-Burma-India Theater, commanded by General Joseph W. Stilwell.

[7] Southeast Asia Command, commanded by Admiral, the Lord Louis Mountbatten.

[8] Until V-J day, all supplies from the U.S. and Great Britain destined for either China, Burma or India had to be shipped to Indian ports and transshipped to destinations elsewhere in that vast theater of operations. Calcutta, Bombay and Karachi were the chief ports of entry.

[9] "Army and Navy Commanders were well aware of the difficulties and paucity of means" Marshall, *op. cit.*, p. 56.

[10] N.C.A.C. abbreviation for Northern Combat Area Command, the official name of the combined force operating under command of Gen. Stilwell and later Lt. Gen. Daniel I. Sultan. Composition of N.C.A.C. at this time was as follows: five Chinese Divisions (two American trained and all American equipped), an Engineer Regt., a Truck Regt. and misc. troops, all being units of the Chinese Army in India; one British-Indian Division; Northern Combat Area Command Hqs., Mars Task Force (124th Cav. Regt., dismounted, 475th Inf. Regt., two Bns. Arty. 75mm pack and six animal Q.M. pack Troops); the tenth U.S. Air Force; and approximately 30,000 S.O.S. line of communication troops alternately engaged in construction of roads, pipelines, airfields, transportation, storage and issue of supplies and equipment and intermittently called upon to augment combat troops in the line. "As fast as the combat forces moved ahead, United States Engineers, commanded by Brig. Gen. Lewis A. Pick, shoved the road forward behind them, operating their bulldozers so far forward that they were frequently under fire." Gen. Marshall, *op. cit.*, p. 60.

[11] Indian—, meaning, "any individual engaged in any occupation," example: air wallah—a member of the U.S. Air Force.

bombs, and even stationery (for they fight a paper war down here just as much as in the Zone of the Interior). Circling after take-off we gaze out over the area adjacent to the headwaters of the Brahmaputra R., known as Upper Assam (there was a social organization known as the Upper Assam Poker Club which met weekly which was at times of the utmost interest to the writer). Here in Upper Assam are located the great U.S. Army supply bases at Chabua and Ledo[12] where ground, service and air force items are stocked for future shipment to Burma and China via the Hump and the Road.

Here too are located numerous transport airfields and the terminus of the truck transport system (later called Motor Transport Service) which moves supplies overland to the combat zone. Earlier this too had been the scene of active combat operations, but fortunately the war has pushed further on. There are also many British and Indian installations of note, particularly the huge oil refinery at Digboi which supplies thousands of tons of petroleum products monthly to the Burma operation. From this point forward the area can generally be described as being thick impenetrable jungle except in the Myitkyina-Mogaung area some 300 miles to the south, and except where military operations necessitated improvement of existing roads and trails. To the southeast, is Pangsau Pass, altitude approximately 7500 feet, about 46 miles from the railhead at Ledo. These mountains form the first major obstacle of both motor transport and air routes. The long climb over the slippery (when wet) road causes its full share of vehicular casualties, while the ever present fogs are a constant hazard to aircraft, particularly since most of the pilots prefer to fly contact along the road trace. I well remember one instance while crossing these comparatively low spines of the Himalayas (Mount Everest farther north is 29,000 feet). We had two chaplains along and a load of assorted troops including American, Chinese, Indians and British; a friend of mine was seated across the aisle engrossed in the *Plague Scene* of "Forever Amber." I felt us begin to circle, looked out of the nearest porthole, and saw one of the most complete fog blankets I have ever seen. Suddenly I was amazed to see through a minute break in the overcast the top of a giant tree; we missed it, but I for one was sure glad we had the chaplains on board. Having once crossed the mountains the remainder of the journey is comparatively safe for aircraft. Travelers over the road are not so fortunate; descending gradually it winds in and out of the hills and crosses the watershed of numerous small rivers which during the monsoon season are swollen to the size of major water obstacles.

Among the most important streams are the Chindwin (of Wingate's Raiders—or Long Range Penetration Battalions fame), Tirap, Tanai, Hukawng and the Mogaung. On this portion of the road there was in the vicinity of Shaduzup a strip of corduroy approximately 12 miles long over which for months all wheeled vehicles had to be towed by "cats" (bulldozers). You can well imagine the maintenance problems incident to negotiating such a barrier with any considerable amount of equipment. After crossing the Mogaung River, we finally emerge onto the great plain of Central Burma and the Valley of the Irrawaddy River. Myitkyina on the west bank of the Irrawaddy and the principal city in the area (once a populous industrious British frontier town, now leveled by incessant bombing artillery barrages and Infantry fighting) is the key to the entire campaign and the hub of activity of the forces concentrated here and to the south. There are two routes, other than air, to the South from Myitkyina to Bhamo the next town of any importance, 90 miles to the South. One is the Irrawaddy River which in peacetime had been negotiable in certain parts of the year. There is however, a deep gorge about halfway between the two towns and after considerable research and exhaustive investigation and study it was decided not to use the river route; the primary reasons for such decision being a lack of suitable floating equipment, lack of sufficient experienced U.S. personnel and the fact that the old native pilots who used to take commercial steamers through were scattered to the four winds. The other surface route is overland on a road which had to undergo extensive improvement to support military traffic. After leaving Bhamo, the rest of the way to Lashio is via a portion of the same road mentioned above (now a victim of the war, weather and the Japs) which also had to be improved to support even light military loads. The area between Bhamo and Lashio is in general hilly, jungle country cut by numerous aimless water courses. Logistically, Lashio is the final objective of the Chinese-American forces in Burma.

Logistical Bases Developed

At the time of the opening of the offensive in Central Burma the bases in Assam, Chabua and Ledo primarily, had been developed to the point where they were capable of adequate logistical support to such an operation. Consequently, upon the Intermediate General Depot and the Northern Air Service Area Command at Chabua and the Advance General Depot at Ledo fell the full responsibility for stocking sufficient supplies to maintain the combat force. The transportation problem was somewhat different. The Tenth Air Force furnished the planes (approved earlier by the Joint Chiefs of Staff) and pilots for airlift while Advance Section with Headquarters at Ledo constructed and operated pipelines, completed and improved the road and furnished and operated all truck transportation with the exception of that provided by the Chinese Truck Regiment. The principal means available to accomplish the mission were as follows: two 4-inch and one 6-inch pipeline (the latter was not completed to Myitkyina until May 1945), 148 assigned aircraft (C-47s) and a variable number of Q.M. Truck Companies (ranging from 25 to 54). On the other hand there was little in-

[12]Chabua: Intermediate General Depot, Northern Air Service Area Command. (N.A.S.A.C) Ledo: Advance General Depot (parent organization of sub-depots developed at Myitkyina and Bhamo).

dication that the Jap could or would reinforce or resupply his defending troops in sufficient quantity to prevent the reconquest of this portion of the British Empire; in fact, the writer is of the opinion that no further effort was made to resupply the Jap Army in Burma, and that he was fighting a delaying action using the reserve he had built up earlier and by depending on local requisitioning. Although the picture was dark, there was still hope and confidence that we would meet and defeat the Jap.

Since previous experience had proven the necessity for air-ground cooperation and coordination, even in supply matters, the theater commander called a conference in early October 1944 to work out the various phases involved in supplying N.C.A.A. and supporting units. The force to be supplied has been discussed in detail earlier in the paper. The agencies involved in handling and delivering supplies were Intermediate Section, N.A.S.A.C., Advance Section, Tenth Air Force, British-Indian contingents and N.C.A.C. All interested agencies were to come to the meeting prepared to discuss in detail methods for coordinating and accomplishing procurement, loading, delivery and issue of supplies. The problem involved the building and enlarging of airfields from Assam to Lashio, completion and improvement of the road, completion of the pipelines, construction of sub-depots at strategic locations along the route of advance (Myitkyina and Bhamo became the principal bases), packing and loading of supplies on aircraft and trucks, labor incident thereto, coordination of loading, schedules for aircraft and truck convoys, pilot replacement, truck and aircraft replacement, maintenance, communications and finally distribution and issue to front-line units. To this initial conference the conferees brought estimates, for the ensuing six months, of quantities of supplies and services required monthly by type (to enumerate a few: pipeline materials, rations, ammunition, road construction materials, airfield construction materials, petroleum products, forage (there were about 6,000 animals in the force), air technical supplies, civil affairs, personnel replacements, signal equipment and even local air and truck passenger traffic. In like manner the delivery agencies brought detailed plans for their maximum transport capabilities.

The following system was evolved which with few minor exceptions and modifications remained in effect until the capture of Lashio and the conclusion of the campaign in May 1945. A conference was scheduled to be held at Ledo on or about the 25th of each month.[13] All agencies would prepare estimates of requirements for the succeeding three months and be prepared to present them together with justification therefor. The situation was such that the normal procedure of using safety factors and padding could not be accepted. Particular emphasis was to be placed, however, on estimates for the month immediately following, which figures were to be firm and the absolute minimum for existence. Figures for the two subsequent months would be a basis for advance planning by theater and subordinate staffs, in particular by transportation agencies. Based on these future estimates, target dates for completion of pipelines and advancement of the road could be adjusted, timely construction of advanced airfields could be undertaken, trucks could be ordered from the U.S., forward depots could be planned and in general target dates for all phases of construction could be planned. The Commanding General, N.C.A.C., through his G-4 was given the responsibility of consolidating requirements for American, Chinese and British-Indian Ground Combat forces; N.A.S.A.C. was to be responsible for consolidation of all Air Force common-user and air technical requirements including Tenth Air Force, Air Service Command and Air Transport Command; Advance Section, S.O.S. would present its own figures for construction, maintenance, transportation, labor, etc.

All agencies could request both air and ground lift, and in reality the ground forces obtained many times more tonnage by air than did the air elements themselves. At the conference all the requirements were set up and compared with predicted capabilities; in almost all cases requirements exceeded capabilities. By agreement on the spot, agencies could and would reduce, adjust or eliminate certain items (this procedure was possible because each agency was represented by personnel authorized to make decisions in the name of the Commander). In return the transport agencies always succeeded in increasing (at least theoretically) their capabilities. Ordinarily original estimates and requests had to be reduced by about 25 to 33 per cent, and estimated delivery capabilities increased accordingly to make the two factors coincide. At the monthly conference the theater representative, normally an officer of the G-4 section (occasionally accompanied by a G-3 officer) acted as chairman and recorder, entering the requirements and capabilities as originally stated and as finally agreed upon by all representatives as sound, reasonable and practical; after the conference he returned to theater headquarters to prepare the allocation for submission to the Chief of Staff for approval and for publication. As the Commanding General was usually at the front his personal approval was obtained only at times of the utmost gravity. On such occasions a staff officer was dispatched with the allocation to secure his signature to the Plan. Almost invariably minor reductions and adjustments had to be made at theater headquarters. Upon approval by the Chief of Staff a radio message was dispatched announcing the monthly allocation. This was then followed up by letter repeating the allocation and showing in detail requirements and capabilities with notes of explanation and comments on items effecting the monthly situation (such as an increase in the number of trucks per truck com-

[13]In December 1944 a modification was attempted; the theater representative was sent to each Headquarters (spread over an area 400 miles long) to obtain estimates and requirements and to consolidate before returning to confirm the allocation. This to be sure saved the subordinate agencies valuable time initially, but results did not justify the change, so the original procedure was reestablished the next month continuing through May 1945.

pany to bring the operational total per company to that listed in the T/E).

The letter was in effect confirmation of the radio dispatch and naturally less garbled. Long radio messages have the unhappy attribute of rarely reaching all agencies without some transmission errors. A letter confirmation was advisable and in my estimation absolutely essential.

Operational Phase

From this point in the process we go into the operational phase of the system. The coordinating agency designated by the theater commander after wholehearted agreement by all agencies was the G-4, N.C.A.C.; this office actually supervised and coordinated the operation of the newly agreed procedure. Without going too much into detail I would like to hit a few of the high spots in the mechanics of carrying out the program. Initially the bulk of supplies were air delivered, being loaded at air bases in Assam, such as Dinjan, Moran and Ledo, and air landed at fields at Myitkyina and Mogaung. A small amount of air dropping was done to units out in the jungle not near accessible land routes or landing strips, such as O.S.S. patrols, combat patrols and air warning system operators. As yet the road was not capable of supporting the tonnage needed to maintain an operation of the magnitude planned, nor were there sufficient amounts of road transport equipment. Certain items such as fragile signal equipment and air technical supplies were landed at intermediate fields, adjacent to the road, north of Myitkyina. It might be well to add here that normal channels of requisitioning were followed, the main difference being in the method of delivery, since delivery was being made by so many different agencies and modes of transportation. There were excellent communication facilities between all the headquarters concerned, among them being telephone (by May 1945 telephone communications existed all the way from Delhi, India to Kunming China—the first such line in history), teletype, radio, messenger and frequently use was made of staff planes of the various air headquarters to establish contact when other means of communication failed.

As the months passed and the combat forces penetrated deeper into Burma it became necessary to deploy transport aircraft to more advanced fields by necessity adjacent to the road. These fields had to be planned and built months and weeks prior to the necessity for their use; target dates could therefore be planned from the forward estimates referred to earlier. As the air moved forward (to reduce turnaround time and radius of operation to a minimum) ground transport had to assume the additional load of hauling supplies from Assam to these advanced fields for transshipment and further lift by air to the front. A combination air and truck operation developed which proved to be highly satisfactory and successful. For example: planes which had been based at Dinjan at the beginning of the offensive leapfrogged forward to Shingbwiyang; truck convoys from Advance Section at Ledo now brought supplies over the road to this point where they were transshipped to cargo aircraft. Such a system made the maximum use of planes and trucks alike and allowed a shorter radius of operation to the air; by giving the air a few extra hours of daylight they could make two instead of one trip per plane per day. It proved much more economical to press more trucks into short haul service than require aircraft to fly all the way from Assam to fields forward of Myitkyina and Bhamo. Gradually the air, motor transport and pipelines inched forward until they all reached the Myitkyina-Bhamo area. All points South could be reached from either of these two locations by air without difficulty; accordingly, at this point, it was decided to discontinue leapfrogging forward on a large scale. By May 1945 at Myitkyina, there were four major airfields capable of supporting C-54s and B-29s, a huge S.O.S. sub-depot, and Air Service Command subdepot. Three pipelines flowed through with the 6-inch pipe terminating here. It was also the principal way station on the road.

Bhamo with a large airfield, was the terminal of one 4-inch pipe and was also another key point on the road. The supply sub-depots had been recommended by Headquarters Advance Section and N.C.A.C. some months earlier at the close of the Hukawng Valley Campaign; by advance stock-piling at these sub-depots (15-45 days) the combat forces were able to exist during times of bad weather, breaks in the pipeline and road washouts. They were a veritable lifesaver. As demands on truck transportation increased it became necessary for the theater commander to authorize overloads on the 2½-ton trucks which were the mainstay of the Motor Transport Service. I do not qualify the term 2½-ton truck purposely, for we had G.M.C.s, Studebakers, 6x6s and 4x6s. Because of the road conditions, (some of which have been enumerated above) and inexperienced drivers, vehicular maintenance assumed magnitudinous proportions. 1-ton trailers proved highly unsatisfactory mainly attributable to road conditions. At one time there was an average of only 25 to 30 trucks rolling per Q.M. truck company. To compensate, all available assistance was accorded Advance Section; additional maintenance measures were undertaken including activation of additional ordnance maintenance units from lower priority activities throughout the theater, stepping up production of the engine overhaul and rebuilding plant at Calcutta, improvement of rail schedules for these rebuilt engines and other major assemblies and lastly by the expedient of increasing the T/E of each Q.M. truck company by a sufficient number of trucks to bring their operational total to 48 per company. This latter expedient utilized manpower which otherwise would have been idle waiting for vehicles to come off deadline. By early 1945 however, a flow of 5-ton 4x2 semi-trailer trucks began to arrive in the theater (these trucks had been designed at least two years before for use on the Burma Road, but the first 5,000 off the assembly line had been diverted to

Europe to run the Red Ball Express).

These were immediately shipped to Ledo and pressed into service, under the Motor Transport Service, hauling to Myitkyina. Needless to say the day was saved as far as truck transport was concerned although all the problems had not been entirely eliminated by any means. The air too had its problems. Replacement transport aircraft were regarded as a pipe dream dreamed up by the editors of F.M. 101-10 at Leavenworth, I mean they were hard to get. At one time, if memory serves me right, there were only 90 planes operational of the 148 originally assigned. Pilots flew double the number of hours permitted by Army Air Force flying safety regulations. In his report General Marshall says, "The troop carrier squadrons at the height of the campaign averaged 230 hours of flying time for each serviceable plane per month for three months. The normal average monthly flying time is 120 hours." One interesting example which shows the extent of coordination between all services was the one where S.O.S. organized parties or teams which moved into forward landing fields to unload aircraft. By proper organization enough time was saved to permit many more trips per squadron per day. These parties were usually composed of a non-commissioned officer, a few other enlisted men, possibly a few native bearers for labor, and a truck. At the peak of the operation S.O.S. was delivering by truck approximately 1500 tons per day, including about 600 tons to advance airfields for transshipment and further delivery by air. The air force was delivering 750 tons per day with a maximum of 148 assigned airplanes (about 120 operational) at an average turnaround or radius of operation of 300-350 air miles. You can see that an all out effort was necessary if the campaign was to succeed. Even at the rate of delivery described above, all combat troops did not live on the "fat of the land," and at times had to tighten their belts to continue the drive. In February and March two crack Chinese Divisions were recalled to China to assist in the defense of Western China. The situation did not improve however, because the planes originally assigned to support these two units were likewise transferred to China.

On January 27, 1945, Wanting (on the Burma-China border) was captured, thus opening the road (a few weeks later officially named the "Stilwell Road" by the Generalissimo, in honor of the man who had made its completion possible) to one way traffic to China. Penetration to the south continued until its termination in the fall of Lashio on March 5, 1945. Here ended the Central Burma campaign in so far as the Chinese-American forces were concerned. Soon afterwards it became necessary to withdraw all but a token force, to the truckheads and airheads at Myitkyina and Bhamo. The mission of the token force was to prevent Jap reoccupation of the road north of Lashio and also to insure uninterrupted traffic over the Stilwell Road. From that time on, the bulk of troops and effort were transferred to the China side of the Hump.[14]

No small degree of credit goes to the British forces operating under N.C.A.C. By agreement on a theater level, the British furnished their own supplies over their own transport system until it reached Ledo or Chabua. They likewise furnished labor at airfields for loading transport planes, and at Ledo for loading trucks, with supplies destined for British-Indian units. Liaison detachments were provided. To these detachments as well as the American supply agencies is due much of the credit and praise for the smooth functioning of the inter-allied supply system.

However, the greatest praise must be given the G-4 of N.C.A.C. who, through his own personality and tireless efforts effected the great degree of cooperation that existed, and who supervised the system to the point where even the most difficult jobs became routine. With few exceptions, the flow of supplies to all units proceeded without interruption until the end of the campaign. Again in the words of General Marshall, "The Asiatic operations had been maintained at the end of the most precarious supply lines in history."

The success of the campaign was naturally the result of sweat and blood and sacrifice on the part of the front-line soldier, but even so, it could not have been brought about without the wholehearted support, untiring superhuman efforts and unparalleled cooperation of the men all along the line of supply. In the minds of many of the personnel engaged in this battle against time, space, and weather, there were three mottos that were ever present. Over General Stilwell's desk hung the slogan: "Consider the turtle, he gets no place unless his neck is out." Colonel R. E. Coughlin expressed his sentiment thusly: "Make this a war, not a career"; and in the minds and hearts of all of us was the motto of the entire American Army, "The difficult we do today, the impossible we do tomorrow."

Many a seemingly impossible task can be solved with the wholehearted cooperation of everyone concerned. Although without it the task is necessarily doomed to failure, with it, the chance of success is almost certainly assured.

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[14]That section of the Himalaya Mountains lying between China and India and running generally south along the Burma-China border. Famous as the formidable obstacle over which A.T.C. combating weather and the Japs maintained the lifeline to China.

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AN ESTIMATORIAL

? THE RUSSIAN ARMY TODAY ?

by Major Hal D. Steward, Associate Editor

IT has been estimated recently by reliable authorities that Russia could probably invade and occupy the whole of Western Europe against resistance from present American, British and French troops in Europe in a matter of 48 hours.

This is possible because of the high state of training and conditioning that has been maintained in the Russian Army since the end of World War II. The recent trend by Russian militarists toward heavy motorized and mechanized units that are rapidly replacing foot soldiers is also a factor that is worthy of more than passing analysis.

The Russian Army, according to the best informed sources, now has 10 mechanized armies in all of Europe. Each mechanized army has an organization of three corps with each corps having one motorized and two rifle divisions. However, the existence of corps with two motorized divisions and one rifle division would seem to indicate that the Soviets are striving for complete motorization in the army as rapidly as possible.

Motorized divisions of the Red Army are organized along the lines of an American division, only smaller in actual strength. Each division has three rifle regiments that are transported in trucks and American half-track vehicles. Also included in each division (which has an estimated total strength of about 5,000 men) is an artillery brigade of three regiments of three battalions each.

No definite conclusions can be drawn from the present Russian organization of its units, because they are in a continual state of evolution.

A full army of three corps as previously mentioned would currently run to an approximate strength of 50,000 to 60,000 men.

Just prior to World War II the Russians had their old Rifle Corps, which normally had three infantry divisions, but during the war were sometimes expanded to seven or eight divisions. At the end of the war several divisions in each of these corps were deactivated. The corps then were reorganized with all the trucks and half-track vehicles in good condition from the deactivated divisions going to the first division designated as a motorized unit in the newly reformed postwar corps. In this way, the motorized divisions of today have the best transportation and equipment available from several deactivated divisions.

Today the Red Army is in a superior state of training. Leadership in all ranks is excellent. The new type noncommissioned officer is a product of school training.

Practically all the officers in the present Soviet Army were commissioned by way of schools and have a good academic as well as a military education. Most junior officers are in their twenties or early thirties and the senior Russian Army officers are about in the same age bracket as American officers.

Maneuvers in the Russian Army take place in all four seasons regardless of prevailing weather conditions. All units in the Army are required to participate. Each maneuver starts with small unit problems supported by organic heavy weapons. The size of units involved in the maneuver problems are increased until they include large-scale division, corps and finally army maneuvers. Corps and army unit operations are usually supported by one complete division of artillery. This artillery division is in addition to the organic artillery of the regular units. Tank and air units are also used as supporting troops in their tactical problems.

Critiques are held by top-ranking Red officers at the conclusion of each maneuver. At these critiques enlisted men who have distinguished themselves in the maneuvers are selected to attend noncommissioned officer and officer schools in preparation for promotion.

Russian training compares with the best military training of the United States Army. It receives the close supervision of the commanding general and chief of staff of each division. In occupied countries, training is carried on six days a week—Sunday being the only holiday. The Red Army is in no way becoming stagnant or stale from occupational duty.

Strength of the Russian Army today is believed to be between 3,500,000 and 4,000,000 men. A military training program is also carried on that starts at the age of 12 years, when elementary courses in military science are given two hours each week. Compulsory training begins at 16 and continues to 50.

Estimated population of Russia including the Baltic Republics, occupied Poland and lands returned by Rumania to the U.S.S.R. was about 195,000,000 in 1940. Besides Russia Proper, which has a population of approximately 110,000,000 there are 16 Union Republics that go to make up Greater Russia and bring her total population near 200,000,000 persons.

Russia is said to have a potential military strength of some 40,000,000 persons. This means that she would muster into service all physically fit male and female persons between the ages of 14 and 60.

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Editorial Comment

Sergeant Rossow.

MASTER SERGEANT WILLIAM R. ROSSOW, JR., our former Circulation Manager, left the JOURNAL last month to be discharged, and returned to civilian life. He had served with the JOURNAL staff for a year and a half. A hard and conscientious worker, he originated and maintained a highly efficient system in our circulation department, which he ran singlehandedly.

Sergeant Rossow, now that he is a civilian, plans to attend the University of Notre Dame and major in Business Administration.

Just prior to being discharged from the Army he was recommended for a commission as a Second Lieutenant in the Officers' Reserve Corps. He is almost certain to receive the commission.

The Executive Council joins the JOURNAL Staff in extending our thanks to Sergeant Rossow for his untiring efforts in maintaining the standards of the ARMORED CAVALRY JOURNAL and wishes him the greatest of success in civilian life.

NEW CIRCULATION MANAGER

Technician Fourth Grade Carlton H. Garris is our new Circulation Manager. He is a veteran of five years' service and saw foreign service in the Middle East during the war. A commercial artist, Sergeant Garris will do some art work for the JOURNAL from time to time in addition to handling circulation.

BRITISH HORSE SHOW*

In view of the preparations for the 1948 Olympic Equestrian Games the following is published as being of interest to United States horsemen:

The Army came back with a bang at the Royal Windsor Show, when, in the International Trial jumping competition, serving officers filled the first four places. This is an inspiring achievement and, whatever the eventual selection of our international team at the White City may be, it is a reasonably safe bet that two places will be filled by the B.A.O.R. The competition is pretty keen, for among the civilians are Lieutenant Colonel Llewellyn, already experienced at Nice and Rome in international jumping, Mr. "Curly" Beard, riding either "Gay Lady" or "Niblick," the property of Mr. John Woollam, Mr. Neill with "Sparky" or "Spot," Mr. Lane, and so on.

Major D. N. Stewart, of the Royal Scots Greys, won both the King's and the Prince of Wales's Cups at the Royal Tournament, and followed this up by winning the International Trial at Windsor—three major victories in succession. His mount, the smallish, brown and, if truth be told, rather ugly, half-bred Hanoverian "Gnome," is not only a grand jumper but also a lucky one.

The soldiers have been hard at it to acquire international technique from the best German instructors and have profited from their labor. The theory is that, so far as giving "the office" is concerned, this is a matter of schooling behind the scenes. The resulting well-balanced animal is, in the ring, allowed to "date his leaps" himself with a minimum of wrangling from his rider. All the riders use a plain snaffle and dropped noseband, dispense for the most part with martingales, and yet show complete control and an admirable carriage of the head by their mounts. It is hard work to acquire and maintain the "Continental" or "forward" seat in the saddle. The hollowed back, rigid grip of the thighs, the freedom of the leg below the knee to apply the aids, the light but constant contact of hand to mouth—all take learning and imply a physical strain, but the result is magnificent. Englishmen are perhaps heaven-born horsemen, but even they can learn.

This subject invites endless dissertation, but space forbids. Lieutenant Colonel A. B. J. Scott is probably the most finished all-round horseman of the lot, but he and that grand big horse "Turban" have been out of luck. Of the others, Lieutenant Colonel Nicoll, of the

**The Royal Armored Corps Journal.*

Horse Gunners, seems to have the seeds of greatness in this particular sphere.

Let it be added that the performance of the B.A.O.R. riders and their horses has brought us all up with a jolt and caused us to revise our notions. Show jumping may be a separate art, but the essentials of horsemanship remain constant. I do not know who will represent us at the White City nor at the Olympic Games next year, but I am happy to say that, despite universal mechanization, the Army continues to lead the nation in the exposition of "noble horsemanship."

Dressage Tests

There are two schools of thought in matters of equitation which can conveniently be described as the snaffle-and-ashplant school and the how-to-ride-'em boys, both equally respectable in their own way. There is no doubt at all that many of the former will show the way to many of the latter when it comes to getting across a country with hounds running on a breast-high scent, but it is equally true that the best of the latter, provided that they possess the *esprit* of the former, are the best of all. This profound observation is called forth by the revival of *dressage* tests in many of this year's major shows, including the International at the White City. As to this art, there is generally considerable obscurity, for the erroneous belief that it is high school dies hard. The practice of physical training has been proved invaluable to the soldier and indeed to all mankind. Is it unreasonable to suppose that the same system applied to horses can be anything but beneficial? For this, in fact, is all that it is: a series of exercises designed to develop the muscles and to improve balance, flexibility and obedience to orders. We have all of us learned the elementary movements in our early service in the riding school under instructors of varying degrees of ferocity.

To a horse-soldier the ability of his charger to perform these movements was in old days a matter of life and death. Therefore he was taught them. The same in less degree applies to civilian riding. You get, for instance, a more enjoyable hunt on a horse to whom you can explain (and insist on performance) that you require him to stand still, move sideways or rein back. The *dressage* tests go little further, save to demand a rather more exact performance.

Naturally, when it comes to competition, comparisons are inevitable. No horse that is of faulty conformation can carry out the movements exactly, no horse that has not a free, balanced action is likely to score heavily, any more than a man of bad physique is likely to excel at gymnastics. To suggest that *dressage* ties a horse up and makes him "sticky" is fatuous, for it does exactly the reverse, and jumping is part of the test. Few of us nowadays have sufficient leisure to go in for *dressage* competitively, but all of us would benefit from a modest practice of elementary exercises, as would our horses. We shall see the best we can do at present at the White City, where the test will be that for the *Prix Caprilli*, the most elementary of the three degrees. The competition is only open to British competitors. The improvement already made suggests that within perhaps five years we shall be able to compete on equal terms with the best performers in the world in the highest degree of the *Grand Prix* test.

The Revival of Polo

It is good to hear that the revival of polo continues all over the country, though the numbers of young recruits to the game still leave something to be desired. The difficulty (as in all things) is mostly the lack of funds. In order to improve the situation the County Polo Association has circularized all old players of the game, suggesting that they should subscribe to a fund designed to help the country clubs to recover. It is to be hoped that this appeal will evoke a ready and generous reply in the interests of the greatest game of all.

Many regiments still have substantial funds lying idle in their polo accounts. Though I understand that it is the intention to revive Army polo once circumstances permit, the contributions from that source might well be made, since for the time being, soldiers who are keen to play will be dependent on the hospitality of the country clubs.

A new club has recently been formed at Henley which seems to have a promising future before it. The club has one absolutely first-class ground in commission with space for two other full-sized grounds available, excellent stabling not far off, and it is admirably situated for easy access from London and elsewhere. Lord Cowdray has begun his season at Cowdray Park, the Rugby Club is busy, and there is regular play at Brockenhurst, Ham and Toulston. An attempt is being made to revive the Manchester Club, and I believe there will be polo again at Taunton this season. The game as we knew it before the war is still far away, but the signs of recovery are healthy. It is possible, even, that we may see a week's polo at Roehampton this year for the Country Cup. At least eight teams should be entered—possibly more.

Young Hunters

There is still a notable shortage of young hunter produce at this year's show. This is not surprising, since we have been busy on more important affairs for the past seven years, but though good three-year-olds are very few there is a welcome increase, in both quantity and quality, in the two-year-old and yearling classes. In the open events such veterans as "Wavering Bee" and "Darrington" still carry all before them in the show ring, though we may hope for some good youngsters at the White City. This again is not surprising, for success in the ring is not attained without long and careful preparation. The value of hunter classes in England is perhaps questionable, for the "champions" are often hunters only in name, being far too valuable to risk in

the hunting field. They do, however, at least demonstrate the ideal type of hunter, which is perhaps desirable. To find the perfect hunter, as to find the perfect polo pony, it is necessary to hunt or play him. Some of the greatest polo ponies ever known would not have been looked at twice by a show-ring judge. In America the champion pony is judged not only on conformation but also on proved performance during a strenuous season. The introduction of classes for genuine hunters might give an added incentive to breeders.

The Export Trade

In spite of crippling freightage and duty, the demand for English-bred horses and ponies continues to be strong not only in the Dominions and the Americas but elsewhere. The strongest is for Arabs and Welsh ponies, the most popular of our nine native breeds. At the recent Bath and West Show there were many foreign buyers and, with a little encouragement, our great export trade might soon be revived. There is little doubt, too, that if ever Europe is permitted to return to anything like normal one of the first demands will be for our horses. The position in India is said to be deteriorating rapidly and unless (as seems highly improbable) the new governors of that sub-continent take immediate steps to retard this deterioration, India will no longer be able to produce horses comparable with those bred under the British Raj. This may have the effect of increasing the already substantial Australian import. "It's an ill wind that blows nobody any good," but it is depressing to think of all the good work done by generations of Englishmen in maintaining a high standard of Indian-bred horses (as indeed it is in even more serious matters) being undone almost with a stroke of the pen. No doubt there will still be a strong demand for high-class animals of all kinds from the Native States. We must be careful not to lose this trade to, for instance, the Argentine.

* * *

Washington, D. C.
September 25, 1947.

My dear General Wainwright:

It is with a sincere feeling of regret that we note your retirement from active service with the United States Army. Yours has been one of the proudest and finest careers of military service in our history.

You can be justly proud of the inspiration you have been to all those who have had the good fortune to come under your guidance and leadership during the years of your active service. You must also get a great deal of satisfaction in knowing that the ideals and wisdom you have attempted to impart to those in your various commands have not been in vain.

We do not wish to congratulate you on having completed your army career because we know you leave it with deep regret, but we do want to congratulate you on your enviable record in the army, as well as the inspiring example you have been to every American. Even after the hard and strenuous service you underwent in World War II, I know that you still leave active service reluctantly.

With best wishes for good luck and good health from the Executive Council, the staff and my own personal regards, I am

Very sincerely,

Edwin M. Sumner,
Colonel, Cavalry,
Editor.

The ARMORED CAVALRY JOURNAL is most anxious to obtain copies of the July-August, 1946, issue of the Journal. All those persons who have this issue and who are willing to part with it are requested to forward it to the Journal. The Journal will pay the regular price of fifty cents (50¢) a copy for each copy returned.

OTHER BRANCHES

Major General S. B. Akin

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(Editor's Note: All members of "Other Branches" are encouraged to contribute articles to this section of the ARMORED CAVALRY JOURNAL. *The "Other Branches" section in the next issue will feature a statement by the Surgeon General and a full-length article on the Medical Department.)*

"We hear a lot these days about coordination and cooperation. It is well we should. We can use a lot of it. All of us who have the job of making, and keeping strong the defenses of this land of ours know that it will be working together, each with his eye on the final goal as well as his own individual part in its achievement, that will enable us to have the strength we need.

"There are many ways by which we develop this coordination and cooperation. One is for each of us to learn what the rest of us are doing, what our responsibilities, our problems and our hopes are.

"In publishing its series of articles on the functions and activities of each branch of the military establishment, the ARMORED CAVALRY JOURNAL is giving us an important and popular feature that will do much toward this very end. It should be of special value and interest to everyone who wants to acquire firsthand information about the over-all mission of the Army and the jobs with which each part of the Army is charged.

"The high priority placed on research and development during the present peacetime period emphasizes the determination of our military leadership to maintain the highest standards of superiority in weapons and equipment, and to insure the adoption and production of everything we need for our national defense.

"In its endeavor to publicize the objectives of the Arms and Services of the Army, and the major advances in the field of military science, the ARMORED CAVALRY JOURNAL is giving us a most worthwhile service."

I. B. Akin

Major General, U. S. Army,
Chief Signal Officer.

SIGNAL CORPS

SIGNIFICANT SIGNAL CORPS DEVELOPMENTS

*by Gerald Egan**

This article discusses at length three important developments of the Army Signal Corps; Radar, Weather Forecasting, and Army Pictorial Service. In a recent issue of the Journal, the major activities of the Signal Corps were discussed in general terms. Mr. Egan writes of specific achievements here.

THE postwar reorganization of the military establishment has not altered the mission of the Signal Corps as the communications agency of the Army.

Briefly, this mission includes four major functions. They are: to train and furnish specialized signal troops and units to all requiring elements of the Army; to operate the Army's communications network; to develop, procure, store, issue and repair communications equipment and supplies, and to perform photographic work for the Army except the Army Air Forces.

In a recent issue of the ARMORED CAVALRY JOURNAL the major activities of the Signal Corps were discussed in general terms. Only a passing mention was made of certain major functions which seem worthy of the fuller description which follows.

DEVELOPMENT OF RADAR

The story of radar has been told time and again; its tactical achievements have been narrated in detail and its potentialities as an instrument of peace have been enthusiastically extolled. But actually the drama of radar lies not in its battlefield performance or its future possibilities, but in the imaginative and farsighted research and development program that made radar a decisive factor in the winning of the war.

The technique of radar did not just suddenly appear on the eve of World War II; it evolved during the 1920's and '30's—a product of years of research. Even as early as the first World War, Signal Corps scientists tried to improve on the sound locator as a means of detecting enemy aircraft. Military, naval, and civilian scientists continued this effort during the 1920's. In February, 1936, the Army's research in the field of aircraft detection was centralized in the Signal Corps. Both radio and infrared detection techniques were tried, and on December 14, 1936, the Signal Corps completed and tested its first radar.

Once the effectiveness of that first set had been demonstrated, the expansion of the radar development program was given highest priority. Construction was begun in 1937 on a radar designed to provide electronic data for the automatic aiming of antiaircraft searchlights. This first standard Army radar, with its ponderous "bedspring" antenna, had a dramatic opportunity to prove its value and versatility in the course of its service test by the Coast Artillery in 1938. Several airplanes were detailed as test targets for the radar, and

*Office of the Chief Signal Officer, War Department.

one of these was blown far off its course by a strong wind at an altitude of 20,000 feet.

Cruising over an unbroken expanse of clouds, the pilot calculated his position by dead reckoning and reported by radio that he was flying over the radar position. The radar operators could find no trace of a plane in that sector of the sky, and the observers waited with mounting skepticism. But the Signal Corps technicians, guessing that the plane had been blown off course, obtained permission to extend their search out over the Atlantic Ocean, a few miles distant. Soon they detected an echo from a target eight miles out over the water. The pilot, running low on gasoline, was informed of his true position by radio, and by means of the radar data was guided back to his base.

This first American radar was developed as a defensive weapon. Its initial functions were to provide warning of approaching enemy planes and to supply electronic data on their range, altitude, and azimuth, to aid antiaircraft searchlights in focussing on the enemy. But radar soon proved so accurate that it was used in conjunction with gun directors to automatically aim and adjust the fuzes for antiaircraft fire. This combination of radar and electronic gun director computed the lead necessary to detonate a shell at that point in space which the target plane would reach during the interval between the firing of the projectile and its arrival at the range of the plane.

The same radar which has been designed for defensive functions thus became a weapon of offense. And subsequent developments of radar were designed more and more for offensive purposes. Radar was used in conjunction with high-frequency radio communication to direct night-fighter planes to positions where they could intercept and down nocturnal enemy raiders. Airborne radar equipment was designed to present a glowing image of the terrain over which the plane was flying, so that bombers attacking through the dark of night or through clouds or smoke screens could nevertheless pinpoint their targets. Tail-warning radar was developed for aircraft, to automatically warn the pilot when another plane reached an attacking position behind him. Techniques akin to those of radar were used too for navigation.

On the ground, progressively more efficient radars were developed by the Signal Corps scientists. Many important new uses were found for this technique. One Signal Corps radar set originally designed for the automatic laying of antiaircraft fire was used to fight the buzz-bomb menace in Britain. This set was an important factor in saving England from destruction by the long-range German missiles.

The Signal Corps engineers found that some of their radar models could actually detect artillery and mortar shells in flight, and this discovery led to the technique of mortar location by radar. Mortars were one of the enemy's most dangerous weapons, and a means for the location of enemy mortar positions was urgently needed. A small Signal Corps radar was converted to perform this function, and its efficiency amazed combat veterans. This radar detected the enemy shells on both the upward and downward paths of their flight, and the data on these two positions could be plotted to compute the entire trajectory of the projectiles. By extension of this trajectory, the location of the enemy mortars or artillery could be pinpointed in a matter of seconds, and counterfire could be immediately directed. The radars, by plotting the bursts of the counterfire, could even help our own gunners improve their accuracy, by telling them how to correct their fire for maximum effect.

A more spectacular use of radar is the detection of moving troops and vehicles on enemy-held roads at night. In this application, radar has the uncanny faculty of being able to screen out all stationary background echoes and present oscilloscope data on only the moving objects within its beam. This function is based upon what physicists call the Doppler effect, which may be compared with the periodic bouncing of rubber balls off a brick wall. When a man throws rubber balls at a stationary wall at one-second intervals, the balls bounce back at him once a second. If the wall is not stationary, however, but moves toward the man, the balls return to him more often than once a second. If the wall moves away from him, the balls return less often. The same phenomenon is illustrated in the change in frequency of a locomotive whistle, which sounds higher in pitch when a train is speeding toward a listener and lower when it is moving away. On the basis of the Doppler effect, the Signal Corps scientists knew that radar echoes would be reflected back at a different frequency from a moving object than from a stationary object. They modified their radars, therefore, to filter out echoes from stationary objects and present only data from moving objects. Combat troops found this use of radar particularly valuable for night harassing fire of enemy supply routes. The accurate location of targets by radar resulted in a substantial saving of ammunition during the Battle of the Bulge, when ammunition supplies were critically short, and German prisoners reported that on several occasions the enemy had to abandon the use of his main supply routes.

The achievement of radar contact with the moon, which has probably attracted more attention than any other Signal Corps development, has already laid a foundation of technical knowledge for the defense of the United States against enemy long-range missiles.

The Weatherman at War

Weather proved a more powerful ally and a more dangerous foe in World War II than in any previous war. Weather forecasters have determined invasion schedules, started and stopped air attacks, and provided essential data for front-line artillerymen. In this last war, as never before, weather observation and long-

range forecasting have been vital military operations. And the research and development program which has harnessed science for these meteorological tasks has been one of the most important technological achievements of the war.

Weather forecasting is an empirical science, and it is dependent entirely upon swift and accurate weather observation. Meteorologists know that their forecasts of future weather can be only as accurate as the observations they are able to make of current weather. They have to know, for instance, the temperature, humidity, barometric pressure, and wind direction and strength at various levels above the earth's surface, over wide areas. The techniques used for the gathering of this information have been improved and refined during the past five years to an extent almost unparalleled.

Even before the war, Signal Corps meteorologists were gathering data on the upper atmosphere at widely scattered observation points by means of small balloons. As the balloons rose through the earth's atmosphere, observers followed their flight visually by means of optical devices which enabled computation of the strength and direction of the winds at successive levels. Automatic observational devices were sometimes attached to the balloons to record temperature, humidity, and atmospheric pressure. The balloons burst when they reached certain altitudes, and parachutes opened automatically to lower the recording instruments to earth. Eventually the records were recovered, but that process took so long that the data had little practical value.

One important improvement on this technique was the development of the aerograph, which was attached to planes to perform approximately the same function as the recording equipment previously suspended from balloons. The aerograph made a continuous record of pressure, temperature, humidity, and the air speed of the plane—and made this record immediately available when the plane returned to its base. This was a big step forward, but it still offered the objection that the record covered only the path of the plane, and when aircraft were grounded by bad weather, aerograph observations were impossible.

An even more important contribution to this field was the development of the radiosonde, which again made use of free balloons. The radiosonde not only measures the temperature, humidity, and atmospheric pressure, but converts this data into radio signals which can be picked up and recorded by observers on the ground. Thus radiosonde observations offer the advantage that their data are instantly available to the meteorologists, and they can operate in any kind of weather. The direction and force of the wind can be measured by the optical device already in use or by means of a directional radio antenna comparable to that used for radar.

Even the highly efficient technique of radiosonde observation left much to be desired by the meteorologists. To gather radiosonde data, observers had to be transported to the geographical location where the observation was to be made—and there were not enough trained observers to go around. So the Signal Corps turned next to the field of radar, and the meteorologists found that radar could help them detect distant storms. They took a small airborne radar, originally designed as a high-altitude bombing set, and used it on the ground to bounce radio pulses off cloud banks, rainfall, and other storm phenomena. By this means they were able to detect storm centers as much as 200 miles distant. The storms showed up as white blobs on the radar oscilloscope, and their position and movement could be readily plotted.

An even greater extension of the weatherman's observation range has been provided by the new science of sferics, which is a story in itself. *Sferics* is the meteorologist's name for *atmospheric electricity* and for the technique of locating distant storm centers by long-range detection of their atmospheric electricity. Sferic impulses, which emanate from certain types of storm fronts, have long been known to radio listeners as static.

The sferics technique of storm location makes use of a very delicate radio receiver with a directional antenna. When sferics or static are detected by this delicate receiver, the presentation is made visually, on the face of an oscilloscope, rather than audibly. The directional antenna enables determination of the precise direction to the sferic source. Thus it is possible to plot on a map the direction of a sferic source from one or more sferic stations. When two or more lines are plotted, the point of their intersection shows the location of the storm center. Storms can be located by this technique at distances of 2,000 miles, and continuing records can be made of their position and movement.

By means of the sferic technique, meteorologists in snug weather stations can keep track of storms across two thousand miles of ocean. They don't need an observer at mid-ocean to know that a storm is raging there, and that it is moving toward the shipping lanes. If their observations show that the storm center moved 50 miles in a certain direction in the space of one hour, they can thus plot not only the direction of the storm movement but also its velocity.

These wartime Signal Corps achievements in meteorology have peacetime as well as military value. The expansion of air travel has greatly increased the importance of accurate, long-range weather forecasting. And the Signal Corps is continuing its meteorological research and development programs, for this is one field of military endeavor that will benefit all humanity.

Army Pictorial Service

The Signal Corps has long served as official photographer of the Army.

The credit line "Photo by U. S. Army Signal Corps" is now a familiar one to newspaper and magazine readers. It has appeared under many striking photographs

—often taken in the heat of combat—which served to dramatize American military efforts.

Hundreds of films which saved countless days in the training of new troops were produced by the Signal Corps during World War II. These films were used in demonstrating, for instance, how a rifle is assembled, how a communications wire is spliced, how a tank is serviced. Many were given new sound tracks in foreign languages to increase the practical value of arms shipped to non-English-speaking allies.

In addition to the training films, still and motion pictures were produced for historical record, for information to assist commanders in reaching military decisions, for identification to aid in safeguarding military establishments, for photomail and V-Mail letters and for the reproduction of documents, maps and similar matter, both to preserve valuable information and to supply duplicates.

By the end of the war 2,659 motion pictures had been produced and 302,000 prints had been distributed. In addition, 1,458 film strips had been released to the Army for orientation and training use.

From the hundreds of thousands of still pictures taken by Signal Corps cameramen in combat and in rear areas, 423,000 were selected and returned to the Office of the Chief Signal Officer for military purposes and for civilian agencies in furtherance of morale and public information. The Signal Corps also developed a method of transmitting color photographs by means of radio telephoto channels.

Not widely known is the Signal Corps research and development activity in the photographic field which resulted in the adoption of much new or modified equipment and enabled the Army to obtain an invaluable pictorial record of the war.

Early field reports from combat cameramen indicated that standard photographic instruments did not meet all the exceptional requirements of modern war. There was a demand for a light, motor-driven motion picture camera impervious to dust, moisture or fungus and loadable with magazines containing no less than 200 feet of film.

At the instance of the Pictorial Engineering and Research Laboratories, Army Pictorial Service, the Cunningham Combat Camera was designed and met the most exacting tests. It weighs but sixteen pounds fully loaded. Its electric motor is driven by four dry cell batteries which are carried in a canvas case attached to the cartridge belt. Three magazines, furnished with the camera, hold 200 feet of film each. The movements, made to the exact precision of a studio type camera, are contained in the magazines rather than in the camera itself. It takes only six seconds to change magazines, so if an occasional buckle or jam occurs there is practically no loss of time. And the four lenses need never be touched. The focusing mechanism, controlled by a lever in the hand grip, slides the magazine in or out to the focus point, instead of adjusting the lens as in the old method. This makes possible sealed lenses requested by the men in the field. Diaphragms are also lever-controlled from the same point.

Cast in magnesium, the gun stock base can be swung up to the shoulder, and with the two hand grips giving the steadiness of a tripod, all controls at finger tips, the camera can be focussed, framed and operated as easily as the trigger can be pulled on a Browning automatic rifle.

In the case of the still camera the principal demands of the combat photographers were for an instrument which was proof against high humidity and the fungus growths of the tropics. The new Simmons Combat Camera was designed to meet these demands. It is all metal and practically indestructible. It has no bellows. The front element of the viewfinder folds into position as a lens protector and may be carried in that position to protect the lens from rain and dust. A hinged metal cover protects the film recess. There is a built-in flash synchronizer and an accessory shutter which protects the film from fogging during rewinding of the focal plane shutter. The camera is equipped with two lenses and uses 2¼ by 3¼ film pack. The leather carrying case is eliminated. There is no carrying case since the camera is a completely self-contained unit.

One of the outstanding achievements of the Pictorial Engineering and Research Laboratories was the design of a new clinical recording camera, at the request of the Office of the Surgeon General, which was urgently needed to permit accurate and easy recording of new medical and dental techniques, of surgical operations and of related procedures.

Pictures of small areas and close-up details, requiring critical focusing and absolute steadiness, are often necessary. At the same time medical procedure makes impractical the use of tripod supports or accessory lighting equipment. The photograph must be made at a given movement in a minimum of time, and without interference with medical personnel. Extremely accurate exposure is essential for correct color and tonal rendering. Flat all-over illumination is required for the elimination of shadows. And in addition, since the photographic approach follows from the medical problem, the photographs must be taken by doctors, nurses, or technicians who are not necessarily competent in photographic techniques.

The new clinical camera met all requirements. It proved as simple in operation as a standard box camera and enabled even unskilled persons to take black and white pictures of the fastest action, indoors or outdoors. It uses a high-speed, high-intensity, self-contained light source which was built in to the camera. Every phase of its operation, except focusing and clicking the shutter, is automatic. It weighs 5½ pounds, is operated from a portable electric power pack and may be plugged into any ordinary current line. Due to its extremely rapid flash discharge the camera can "freeze" the whirring of a moving fan blade.

JOINT PACIFIC COMMAND

Unity In The Pacific

*by Lieutenant Colonel J. W. Rudolph**

GEARED to prevent a repetition of the Pearl Harbor disaster, the Joint Pacific Command is today operating successfully through the close cooperation of the Army, Navy, and Air Force.

To properly understand the present unified command in the Pacific, it is necessary to consider the situation that followed the Japanese capitulation in 1945. The surrender had come suddenly, shortly before the announcement of sweeping command changes in the Pacific, preparatory to the invasion of the Japanese homeland islands. The existing arrangement had to be regeared; the collapse of the Nippon Empire demanded an immediate improvisation to provide for prompt occupation.

The establishment of General MacArthur's Supreme Allied Command left unsettled, for the moment, the question of eventual unity of command in the Hawaiian area. Temporarily, the wartime command was abandoned, although close cooperation continued between the local Army, Navy, and Air Force commanders. Finally, after close study by the Joint Chiefs of Staff in Washington, the decision was made which covered the exigencies of a world-wide deployment and insured unity of command wherever American forces were stationed.

Late in 1946, the Joint Chiefs submitted a memorandum to the President which offered an over-all plan for command of the U.S. Forces outside the continental limits of the United States.

As the approved plan was finally published, seven distinct commands were set up around the globe. They consisted of the Far East Command, Pacific Command, Alaskan Command, Northeast Command, Caribbean Command, European Command, and the Atlantic Fleet. Each of the commands was to be directly responsible to the Joint Chiefs of Staff in Washington.

Of the Pacific Command it was said, "The Commander in Chief, Pacific, will exercise unified command over all forces allocated to him by the Joint Chiefs of Staff or other authority."

So it was that the Commander in Chief, Pacific, became known to military and civilian personnel in the Hawaiian Islands as CINCPAC, a title formerly reserved exclusively to the Commander in Chief, Pacific Fleet.

On January 1, 1947, Admiral John H. Towers, one of the Navy's pioneer airmen and commander of the Pacific Fleet, was designated as CINCPAC. Given the prerogative of naming his own staff, Admiral Towers promptly designated the commanders of Army Ground Forces, Pacific, the Commanding General of the Seventh Air Force; and his own Deputy as members of his Joint Command Staff. Although several personnel changes have occurred since, the original arrangement is still in effect.

Presently, Admiral Louis E. Denfeld is CINCPAC. Comprising his Joint Command Staff are Vice Admiral H. B. Sallada of the Navy; Lieutenant General J. E. Hull of Army Ground Forces, Pacific; and Major General R. H. Wooten, Commanding the Seventh Air Force. These officers are officially designated as the Joint Pacific Command Chiefs of Staff and meet together once each week.

The Joint Chiefs of Staff are assisted by various joint groups made up of officers representing each of the services. These include the Joint Plans, Logistics, Communications and Intelligence Groups. Each group functions as a body of specialists in their own field, and is an important part of the delicate machine which makes the command function efficiently.

Coordinating the myriad details of the Joint Chiefs of Staff is the Joint Secretariat, made up of officers detailed from each of the three services.

The Pacific Command can be visualized as a precision machine, supported by a very strong tripod. Each leg of the tripod represents one of the services and all

*Headquarters, AGF, Pacific.

three must function together in order to support the command.

CINCPAC, Admiral Denfeld, exercises operational control over all three services, and policies affecting the Joint Pacific Command Chiefs of Staff are enunciated by him.

Unified Command policies, other than those of a strictly administrative nature, which affect the readiness of the three service components of the Pacific Command are enunciated by CINCPAC or the Service Component Commander concerned.

General Hull, however exercises an operational command which goes beyond that of the local ground forces. By direction of CINCPAC, General Hull would command all fleet, air, and ground forces committed to the defense of the Hawaiian Area in case of an emergency.

In this case, the local ground forces would be under the command of Major General George H. Decker, at present Deputy Commander in Chief of Staff to General Hull; air forces under the command of Major General R. H. Wooten, Commanding, Seventh Air Force; and local naval forces under the command of Vice Admiral J. L. Hall, Jr., Commanding the Hawaiian Sea Frontier; with General Hull in over-all command of the Hawaiian defense.

General Hull would still be subordinate to Admiral Denfeld who, as CINCPAC, would be in command of all operational efforts exerted in the area between the Mainland and the Marianas. Admiral Denfeld would be responsible to the Joint Chiefs of Staff in Washington.

The Joint Pacific Command has passed all tests with flying colors in its first half-year of operation. Each of the services has declared its complete satisfaction, and Admiral Denfeld has stated that he is proud to be on the same team with the Army and Air Force.

Time was when the Hawaiian Division, one of the army's few peacetime concentrations of ground troops, was a fighting organization, trained for the mission of defending the Hawaiian Islands from invasion. Today, however, the Army forces in Hawaii are principally engaged in supporting and supplying the occupation forces in Japan and other forward areas, in classifying and disposing of surplus war materials, in repairing the ravages of wartime deterioration of army installations in the islands, and in rallying from the confusion of rapid demobilization.

During the past year the complicated and arduous job of rolling up and closing out the bases, built in the South Pacific, as the American powerhouse rolled closer to Japan, was completed. The task of disposing of millions of dollars worth of surplus war materials, adjusting claims of foreign nationals and governments, and finally withdrawing all troops from these bases was not greatly publicized, but for thoroughness and rapidity was unmatched elsewhere in the world.

Scores of millions of dollars in surplus properly, scattered from Hawaii to the Marianas, Fiji, New Caledonia, Guadalcanal, and Okinawa, were screened and inventoried. Material needed elsewhere was promptly shipped, and that declared surplus to military needs turned over to the War Assets Administration and the Foreign Liquidation Commission. In a very few months this completed mission will take its place with the base roll-up as an outstanding accomplishment of the Army Ground Forces, Pacific.

In the Territory of Hawaii the army, concurrently with the disposal of surplus property and the shipment of great quantities of needed supplies to Japan, the Philippines, and Korea, has been engaged in repairing military installations and in returning to the civilian economy lands leased during the war period. In a small, crowded community, where land is scarce and valuable, this is an important task.

Before the war, posts such as Schofield Barracks, Ft. Ruger, Ft. Shafter, were island show places. During the war thousands of troops passed through these stations, paused briefly, and went on. There was no time for maintenance, with the result that these posts took a physical beating that still shows deep scars. Schofield was particularly hard hit, and it will be a long time before full repairs are completed.

A small group of antiaircraft artillery constitutes the only combat ground organization present. The Seventh Air Force, stripped to the bone in men and machines, is the backbone of the Army's tactical defense of Oahu. Actually, the picture is not as grim as it sounds, for as long as combat forces remain in Japan and Korea, there is no need for an extensive garrison in Hawaii.

Army strength in Hawaii today is about 1,000 below the authorized troop basis, which is itself but a handful of the hundreds of thousands who crowded the islands during the war. Additional replacements arriving in the fall are expected to make up the difference. Hawaii's Army garrison force, after U. S. occupational duties are over, will probably total about the same as before the war with a much larger proportion of air strength than existed prior to 1941.

General Hull completed his first year of service as Commanding General, Army Ground Forces, Pacific, in July. At a press conference held after his return to Hawaii from a recent 13-day trip to Washington and Alaska, the General outlined future army activity in the Territory.

He said post-occupational plans call for a greater air arm here than the prewar Army air strength. The general describes the defense of the Pacific as resting upon two axes; the Hawaii-Guam axis and the Alaskan axis. He explained Hawaii's part as that of a tree trunk extending from the coast to Guam. The surrounding islands would be branches of the trunk.

Admiral Towers, first Commander in Chief of the Pacific under the Joint Pacific Command, stated when the plan first came into effect: "It formalizes a unified command even more completely than existed during the war in this area. . . . I cannot envisage any repetition of Pearl Harbor under this plan."

Organization Of The Armored Division For Exploitation

by Major Glen L. Foote

EVERYONE knows the importance of tank-infantry cooperation in armored operations; everyone knows that tanks must have infantry in the closest of support for any tank maneuver; everyone knows it is most desirable to have tanks in support of the infantry in an infantry show. Every experienced officer who has seen armor in action harps on the fact; each teacher of tactics pounds on the absolute necessity of the closest of cooperation; and every student heartily agrees. This article is prepared with an idea in mind not to add any more arguments in favor of this already accepted conception of the necessity of this coordination, but to show how one armored division in World War II solved the problem with the organization as it existed at that time and with what success. It is also hoped that in the course of the discussion some indication may be found to influence future thought along the lines of what arrangement of armored elements is best suited for exploitation.

No attempt will be made to establish a claim that the unit we are examining was the hardest hitting or fastest moving armored column or that no one else used the same or similar system, or that other units did not have a good and successful system. From the results obtained by the division in the race across France in the summer of 1944 one must be convinced, however, that the organization for exploitation used by the Fifth Armored Division was a successful one and that it, in six short weeks, paid handsomely for the enormous sums of money and time required for its activation, training and equipment.

The actual arrangement of troops used by his division in the exploitation following the St. Lô breakthrough was the idea of Major General Lunsford E. Oliver, the commanding general of the Fifth Armored Division. His plan, conceived during the training period of his division after he had returned from command of Combat Command B of the First Armored Division in its invasion of North Africa, was based on his observation that there was a great need for closer tank-infantry cooperation. No realization of the plan was possible, however, until the unit had arrived in England and it became increasingly evident that the division was to be used in an exploitation role. Then the idea was presented to the division and hurried and extensive training in implementation of the scheme followed.

Basically this plan called for the formation of a tank-infantry team in which one tank was "married" to one infantry squad. To make such an arrangement possible the division was organized into three permanent combat commands: Combat Command A, Combat Command B, and Combat Command R. Each of these tactical commands had its headquarters (personnel for CCR initially being taken from organic division units and later coming from an attached armored group headquarters, while CCA and CCB used their organic headquarters group), a tank battalion, an armored infantry battalion, an armored engineer company, and a troop of the reconnaissance squadron assigned, with detachments from an ordnance company, a medical company and a field artillery battalion in direct support, all from organic troops of the division. These assignments and attachments or organic troops were permanent: *i.e.*, the 34th Tank Battalion; the 46th Armored Infantry Battalion; A Company, 22d Engineer Battalion; A Company, 75th Medical Battalion; a detachment from A Company, 127th Ordnance Battalion; A Troop, 85th Reconnaissance Squadron; and the 47th Field Artilery Battalion; all these were in Combat Command A if the combat command was operating.

This regular assignment of the same units to the combat command made such intimate appreciation and knowledge of each unit by the other units of the command possible that the closest of cooperation between tanks and infantry was achieved. The breakdown within each combat command was just as regular. Company A of the tanks was married to Company A of the infantry battalion, and the Companies B and

Companies C were similarly wedded. Normally two of these married companies worked under and were habitually assigned to the tank battalion headquarters and one of the married companies to the infantry battalion headquarters. This resulted in two major teams within the combat command, the tank battalion team which was heavier throughout and had a large percentage of tanks and the infantry battalion team which was somewhat lighter and had a relatively high percentage of infantry.

These teams as set up worked, slept and ate together. They lived in the closest rapprochement and surprising loyalties sprang up. Infantrymen grew to speak of "my tank" and tankers spoke proudly of "my infantry." Each came to believe that his little tank-squad team was the greatest fighting unit in the world, that his married platoon and company was unbeatable as a unit, and that all the other soldiers in the army were unfortunate in that they couldn't belong to his particular team. Of course they knew that other units were similarly organized, but each of them was positive that the other teams might be good and all that but no one was quite up to the standards of his team.

Platoons, companies and married battalions developed individual personalities. They each had a set of stock formations which they each would swear by, but with the intimate knowledge they had of other members of their team were able quickly to adopt new formations which had been proved successful by other teams with a minimum of difficulty. Reactions to new situations became faster and faster as the married formations aged. Any delay to the advance of a column one of them was leading would cause immediate steps to be taken to overcome the difficulty seemingly without the least necessity for planning. The attitude became general that "since we can't knock out these opposing tanks except at short ranges, let's hurry up and get within the two hundred yards or so and run over the opposition. They want to run; let's keep them on the move."

So far this has been general sales talk on these married formations: how adaptable they were, how confident they became in their own ability to advance, and how easy they were to handle. Such are impressions in retrospect. But training as married formations had started late. Real teamwork actually developed while the units were advancing through France. Fortunately, the marriage took quickly and while all the kinks were not out when the division first started into action, the honeymoon trip to and across the German border fostered and developed real tank-infantry cooperation. As in most marriages, the usual early misunderstandings and adjustments had to be, and the pairs were not so efficient in meeting early problems as they became later. Mistakes were made and problems proved difficult in the first stages, but things constantly ran more and more smoothly.

To be more specific let's go a little further into detail on the performance as an exploiting force. First of all the division was fortunate in being able to start an exploitation phase strictly as a pursuit. Other units had broken the back of the defense and had the enemy retreating. The first action, and all the action which will be described here was strictly pursuit. The division had not had the misfortune or disadvantage of engaging in a slugging match and thus developing caution. They were still full of the idea that they could chase the enemy all over the continent and whip anything they could catch. All of which made for the ideal pursuit team. Why should an exploiting unit be allowed to have any respect for the running enemy?

The division reached the continent on July 25, 1944. Looking at that timing now it is all too evident that the whole purpose for the unit was exploitation. And further the actual commitment was held up until August 2, when things were really running.

For a first objective the town of Fougeres was assigned. After innumerable traffic snarls and rerouting of columns, things rolled fairly well, the division thought, but just as it was getting close enough to Fougeres to realize it was about to capture its first objective, word came that some infantry division (later found to be the 79th) had already occupied the town, and immediate commanders cynically suggested that units get into fifth gear and see if they couldn't catch up to a fight. Lower units were then told that they would swing South as far as Chateau Gontier, turn East to cut off Le Mans to aid an infantry division in capturing this city.

Speed then became the keyword and the married formations began to come into their own. Combat commands usually advanced in single columns—on the road—alternating the lead between the two teams (tank battalion or infantry battalion as married up), but habitually led by a married platoon of medium tanks and infantry followed closely by one or two married companies. Resistance was never sized up, it was just hit; initially by the leading platoon with support from the artillery in column, and in the course of a very few minutes by the rest of the company and possibly another company with what fighter bombers could be scratched up from column cover or visiting planes. A decision to commit just so much of the force was never reached by judging how much opposition there was, but solely by time. If a company could roll itself into the fight before it was all over, in it rolled. Elements in the column which wouldn't normally close directly with the enemy immediately coiled off the road into firing or protected positions when the head of the column stopped and every medium married company sailed blithely down the road to the fight with no traffic snarls or doubling columns at all—theoretically. If the delaying enemy delayed long enough he had a lapful of tanks and infantry to deal with. Occasionally a company back in the column could be grabbed up and directed around to hit from another direction, but not too often was this necessary. Sometimes their noses would get bloodied and the combat commands would

have to come up with a hasty plan for attack, but the excellent tank-infantry-artillery cooperation made possible by knowing every Joe in the unit well enough to predict his reaction to any situation usually got the column rolling again before too much delay.

Granted resistance was spotty. There was even the situation in which a light tank company commander or a screening mission, whose map reading training in OCS apparently hadn't included much practical work following routes, reported himself inside the city the combat command was trying to surround and cut off. When challenged that he didn't even know where he was he countered that if the questioner would wait a minute he would dismount and read the street signs for verification. Slightly chagrined when he was told he was in a bad place inasmuch as the town had not yet been captured, he withdrew and pouted to a point that he made no more radio contacts for over an hour.

Past Le Mans when racing to cut the Paris highway a column was held up and for some reason the combat commander wasn't in his usual position at the head of the column and started the typical heckling, "Move out. What's holding you up?" The lead company commander's reply, "We are moving. You'll see what slowed us as you come by." By actual count the combat commander saw 17 knocked out guns with assorted spattered crews within easy range of the intersection. Here the lead platoon, by quick gunning and with marvelous assistance from its spouse infantry, had shot one of the most profitable skirmishes to date without losing a single vehicle.

But there were times when the ants got into the potato salad. After Le Mans was taken by infantry elements, the division, at 8:00 A.M., August 10, swung north with the combat commands in more or less parallel columns. Resistance was considerably stiffer and it was not until the late afternoon of August 12, that elements of the division reached the outskirts of Argentan, some 60-odd miles to the north. This town was fanatically held and because of a shortage of ammunition and fuel caused by the supply column becoming traffic snarled by a mix-up with combat elements of the Second French Armored Division, the combat command there was not able to clear the town that day. Early the next morning a sadly inadequate attack was made on the town. In the meantime, enemy tanks had idled into position and CCA took a sound trouncing. Ordered to hold South of Argentan, the division blocked (in connection with other divisions who joined it there) while the tactical air force thoroughly worked over the remnants of the German Seventh Army trying to escape through the Falaise Gap.

Relieved in the Argentan-Gace sector by the 90th Division, on the 15th, the division attacked toward Dreux and the Eure River. CCB had a crossing south of Dreux by 11 A.M., August 16. By August 24, when the XV Corps was released from Third Army to First Army by virtue of an adjustment of army boundaries, the pocket between the Eure and Seine Rivers had been cleared.

On August 30, the division started moving again, through the already liberated Paris and on to the northeast. Continuing northeast toward Conde, on the Belgian border, the division was again halted on September 2, in the vicinity of Cambrai, and on September 4, was turned southeast. Rapid advances were again the order of the day, and by September 10, the division was in Luxembourg, CCA having passed through the capital that day. By September 11, elements were on German soil.

Demonstrations against the Seigfried Line were carried on throughout September 13. On September 14, CCR, reinforced by the First Battalion, 112th Infantry, crossed into Germany at Wallendorf. Because of the limit placed on their advance by corps, CCR was forced to halt when the going was still not too rough. Tied by corps order to terrain not at all suitable for defense, they were forbidden to advance because it was impossible to adequately supply or reinforce them for continued movement. CCR took a good lacing in place. CCB went in to help on September 16; CCR came out on September 19; and CCB finally got out on September 22. This sortie into Germany was disastrous for both combat commands, but when compared to enemy casualties inflicted (2,353 killed, 1,218 captured, and 45 tanks destroyed), the losses do not look out of proportion. What the results of CCR's thrust might have been had it been possible to adequately support them makes interesting speculation. Certainly they had momentum enough and were in no mood to stop.

Thus ended the first exploitation of a green division. In forty-one days from August 2, to September 11, including several days of sitting around during realignment of army boundaries and shifting between corps, this division, committed for the first time, had covered around 800 miles of enemy territory. Total casualties for August and September were: killed, 260; wounded and missing, 1,238; tanks lost to enemy action, 51. To compare with this, the casualties inflicted on the enemy during the same period by the division (no credit being taken for those inflicted by the air working with the units) were: killed, 6,198; captured, 6,047; tanks destroyed, 201.

Such a low ratio of losses to successes is felt by every one in the division to be due to a great extent to the ever-increasing efficiency of the "married formation." The only note of discontent is that there should have been more time for training as teams before the unit was committed to combat, so that the early mistakes caused by unfamiliarity with their teammates might have been avoided. With the slightest bit of encouragement all who went through the action of the division in the summer of 1944 will recommend that an armored division, if it is designed to be an exploiting force, consist basically of composite companies and platoons in which there are organically both tanks and armored infantry "living, sleeping, eating together"—married if you will.

Tanks With Infantry

*by Major William R. Campbell**

IN November of 1943 the 1st U.S. Infantry Division returned to England feeling as any other outfit would after completing three campaigns—that only the infantry fought and won wars.

But, on April 21, 1944, the 745th Tank Battalion was attached to the 1st Infantry Division. This was a very short time before the invasion of Europe but a great deal could have been done with the limited time available if attachments had been made to the regiments.

Upon landing in France, one company of medium tanks was attached to each infantry regiment. Company A was attached to the 16th U.S. Infantry Regiment; Company B was attached to the 18th U.S. Infantry Regiment, and Company C was attached to the 26th U.S. Infantry Regiment. Each regimental commander attached a platoon of five tanks to each of his rifle battalions. These attachments continued throughout the entire Continental War with the same tank platoons and infantry battalions being paired up except for temporary interruptions when it was thought advisable to assign two platoons to one rifle battalion for a special operation. For the greater part of the war the light tank company was attached to the 16th Infantry Regiment which attached a platoon to each infantry battalion. The mortar platoon of headquarters company consisting of three 81mm mortars was attached to the 16th Infantry along with the three assault guns of the same company. This attachment continued to V-E Day. The 105mm assault gun of each medium tank company was attached to the assault gun platoon making it a six gun firing battery. The three tanks were taken from headquarters company, and attached, one to each medium company as replacements for the 105mm assault guns.

Tank platoons attached to infantry battalions were in turn attached to infantry companies for specific operations. Each tank platoon leader received his orders from the infantry company commander of the rifle company to which the platoon was attached; he in turn advised the company commander upon the use of the tank platoon. Company commanders of tank companies located their command posts in the vicinity of the respective regimental command posts of the regiments to which they were attached. This facilitated close liaison with the tank company commander advising the regimental commander on the status of supply and maintenance and making recommendations upon the employment of the tank platoons.

The permanent attachment of tank platoons to the battalion made the tanks immediately available for any action and the tanks and infantry formed a strong team, each with the greatest respect for the capabilities of the other. On some occasions three tank platoons were attached to one infantry battalion for a particular operation, but the greatest care was taken to give the platoons time for maintenance and for their return to their own infantry battalions.

Generally the employment of a tank platoon by each battalion commander was the same except for small personal opinions, and it was not long before a standard procedure for the employment of tanks with slight operational variances went into effect.

In the landing on Omaha Beach in Normandy, France, the 745th Tank Battalion did not furnish close-in fire support for the 1st Infantry Division but one medium company landed shortly after noon on D-day and the other two companies landed on D plus One. They moved foward with the leading elements of the 1st Division, clearing out the hedgerows as they advanced. Caumont, Normandy was taken by June 12, 1944. In this operation both flanks were threatened by the enemy since he was able to hold up the advance of friendly units adjacent to the division. The tanks had aided greatly in the rapid advance of the infantry, and they had been immediately available for the ever present enemy armored threat which could be ruinous to any beachhead if it was not quickly repulsed.

All tank units that gave close fire support from landing craft, mechanized, to the leading waves of infantry were either destroyed before they reached the shore or in their attempts to cross the beach. The tanks, when coming ashore in the LCM's were helpless, all maneuverability had been lost, their fire was inaccurate and they were at the mercy of the high velocity antitank

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guns on the shore. The beach was well mined, the antitank guns were accurate, and obstacles and deep antitank ditches canalized the battlefield.

In my opinion tanks should be loaded on LCM's and held offshore until infantry has cleared the mines and destroyed the antitank gun fire. The tanks are lost if employed before these things have been accomplished. Tank dozers should be gotten ashore early to fill tank traps and clear roads for other mobile equipment.

In the attack it was the mission of the tanks to get the infantry forward by placing point fire on targets that were holding up the advance of the foot troops. The tanks were extremely vulnerable to the panzerfaust and enemy rocket launchers, so they had to be protected by the infantry on all sides. The tank commander usually operated from the ground and controlled his platoon with a prearranged arm and hand signal system, tracer bullets and the SCR 300 radio, but since there were only two of these radios in a platoon it made control by the latter method impractical. The telephone was used seldom since it was usually damaged and in many cases it would have been poor judgment on the part of the foot troops to expose themselves. Each tank working with infantry should have an SCR 300 radio. A telephone with a long heavy duty trailing wire would provide a greater latitude, insure a positive contact, and I think it should be tested to determine its practicability with tank-infantry teams.

The tanks were normally employed as a platoon, and it was only when tanks could not support and cover each other that they were employed in fewer numbers than five. A tank employed alone needed more infantry protection and created a separate maintenance and supply problem. It was found to be most important to have a platoon leader's recommendation prior to an attack since he was much better qualified to determine routes of approach and terrain that might limit his tanks' mobility. The platoon leader must always be given time for a personal reconnaissance before an attack, and each tank commander should accompany the platoon leader if possible.

In the hedgerow country the immediate objective was the next hedgerow. Hedgerow country would be almost fatal to infantry alone, but with tanks supporting and used properly, fair advances could be made with few casualties. The center tanks placed machine gun fire in the next hedgerow and moved forward with flanking infantry while the flanking tanks sprayed the hedgerows running parallel to the axis of advance. A few rounds of white phosphorus would always dislodge a well dug-in machine-gun crew. The infantry was alert to deal with any enemy who escaped the tankers, in their rapid advance.

When attacking a wooded area it was found best to have the infantry advance to within 400 or 500 yards of the wood's edge. The tanks moved up to the infantry and placed direct fire into the woods. When the infantry entered the woods the tanks fired overhead machine-gun fire and moved with the forward infantry elements through the woods with all around protection. This operation, as all others, was influenced by the terrain, enemy weapons and the situation. For example, in taking a wooded area with open, level country to our front and well dug-in enemy antitank guns, it was found better to have the infantry cross the open country at night without the tanks and with no artillery preparation. The infantry was in the woods at dawn; they destroyed the antitank gun fire; the artillery was adjusted on the enemy's rear and the tanks joined the infantry for the push through the woods.

In the approach to the Siegfried Line most of the movement had been made along roads, but after the first defenses of the line had been contacted, the tanks moved off the roads and cross country through the woods. Although the woods were dense for tanks, the defenses of the line were weaker in the wooded areas and the fields of fire were shorter and greatly to our advantage.

The tanks moved up as close as 50 yards in some cases, to pillboxes and fired 75mm APC at the embrasures.

After an opening had been made 75mm HE and WP was fired into the pillbox. This usually brought the occupants out of the box, and enabled the infantry to close in and throw hand grenades and prepared demolition charges into the pillbox, destroying the enemy who remained inside. The engineers blew openings through the dragon's teeth in some places and covered them with dirt in others. Tank dozers filled ditches and covered openings of pillboxes in many cases.

Tank-infantry teams worked very well in the taking of Aachen. A large city such as Aachen channelized the fighting by streets and the standing stone buildings. It was found that the best combination was two tanks on a street with a platoon of infantry providing all around security: this was necessary since the houses offered the defender great opportunity to fire panzerfaust from the windows at tanks. He could also fire his small arms at the infantry. The infantry preceded the tanks by at least 100 yards thoroughly searching the houses on both sides of the street for the enemy. The tanks provided machine-gun and tank cannon fire as requested by the infantry. Before moving ahead the tanks placed HE and machine-gun fire on all positions known to be occupied by the enemy and on all positions thought to be occupied by the enemy. The tanks placed fire on all corners of a street intersection before the infantry moved in and also placed fire down the streets at likely occupied positions, before the infantry entered those streets. This caused the enemy to surrender or to take cover in the cellars, making the infantry advance much more rapidly and easily. The tanks gave the Infantryman a feeling of security as he advanced down the street, since he had the knowledge that either cannon fire, machine-gun fire, or both, would be placed on any enemy who attempted to impede his advance. The Infantrymen had to protect their protectors by constant reconnaissance. Infantrymen observed

intersections and described targets, gave range, direction, and location to the tankers in order that they could move rapidly into an intersection and quickly bring fire on an antitank gun. Four riflemen were assigned to each tank to be directly under the command of the tank commander. It was the duty of these four men to provide close-in security, act as runners and keep the tankers informed of the exact location of the infantry groups working through back yards and from house to house through openings not visible to the tanker. This type of fighting was slow and consumed a great deal of ammunition. This necessitated the maintaining of a battalion dump close enough to enable the tanks to go back to replenish their supply. Each battalion commander had to coordinate the progress of the teams on parallel streets, to keep them abreast.

In attacking small towns, tanks were normally not sent into the town with the leading elements, but remained in a covered position and delivered direct fire into the town prior to the infantry going in and seizing some houses and the town's antitank defenses. The tanks then moved up and supported the infantry in clearing the town.

In a river crossing tanks covered the crossing infantry by firing across the river at possible enemy positions. After the infantry had secured the opposite bank, bridges were built and tanks crossed on them.

Tanks were used successfully in night attacks, moving with the leading elements of the infantry. The tank fire was not too accurate and all adjustment was made with tracer. It was found that it was best to fire only when necessary at night as the fire was inaccurate and disclosed the tanks' positions. The tanks gave the attacking infantry a defense against machine guns, built up his morale and unnerved the defender. The enemy or anybody, hearing tanks at night becomes very much alarmed and especially so if he cannot locate them or determine their number. It was found that better results were obtained when a detailed daylight reconnaissance was made prior to the attack and when plans further provided that the forces arrived on the objective while there was sufficient light to reorganize the ground in preparation for possible counterattacks. This denied the enemy the opportunity for launching a night counterattack against an unprepared position.

In a defense position some rifle battalions kept the tanks with the most forward infantry elements while other battalions assembled the tanks in the vicinity of a forward company or battalion command post. In other cases the entire company was assembled in the vicinity of the regimental command post.

The tanks should always remain on a newly taken objective until it is fully organized and ground mount antitank guns have been brought forward to cover the possible tank routes of approach. Tanks should always be allowed to assemble as a company, if the infantry remains on the defense for more than a day. This permits the tankers to take care of maintenance, familiarize their replacements, reorganize the platoons and allow the men to clean and rest themselves.

The tanks moved in the tank-infantry team set-up on road marches when there was any possibility of encountering the enemy. This was rough but it was the accepted way of moving infantry when the truck attachments were limited. It was found to be better to move the tank company as a unit for marches in excess of 25 miles. This allowed the tanks to move more slowly, thus reducing wear and maintenance troubles.

The light tank company of the 745th Tank Battalion was attached to the 16th Infantry Regiment for the greater part of the European War. It is my opinion that the light company should be attached to a regiment and employed as a company whenever possible, attaching a platoon to each battalion only when absolutely necessary. This company can only be used in the absence of enemy antitank guns and enemy tanks, but it is highly maneuverable and can be used to advantage when a fast, light striking force is needed. I remember one night when an infantry battalion failed in two attacks, to take a hill objective and suffered heavy casualties. This battalion had a company of M-5 light tanks but failed to use them because they did not know the value of such an attachment. The light tanks were finally ordered to take the hill with infantry following in close support. This could have been done at first with practically no casualties, but in this case the value of the company was learned by experience.

The tankers were furnished with post exchange supplies and rations along with the infantry, since it was impossible for the tank company to feed its separated platoons B rations, and it was another binding feature to have the tankers fed hot meals by the ration details of the infantry.

Tankers and infantry both saw the value of teamwork developed through close cooperation under combat conditions. The attachment of the 745th marked the first time that the 1st Division had really worked with a close support tank unit. At first the infantrymen were not sure what they could expect from the tankers but early in the hedgerow country there developed mutual respect which furthered the spirit of cooperation. The 745th was a hard hitting unit that could be counted on to supply the big punch. The infantry showed the tanks that they did not expect them to fight alone and gave them the protection that they needed.

It is felt that in future wars the tank-infantry team will be the great striking force. Such a team should not be made up on the battlefield but must be trained long before battle. Its men must know each other well, must work together, and must learn each other's capabilities and limitations. Its officers must have the spirit of cooperation and teamwork. This is the lesson that can be learned through the experiences of the 745th Tank Battalion and the 1st Infantry Division: that a strong team can be built by the attachment of tanks to infantry; that the team can be adapted to almost any job and that friendly cooperation is the secret of teamwork.

THE TANK *versus* TANK PHASE*

by N. Campbell

The writer's concluding statement—"the answer to tanks is neither the mine nor bazooka, nor the gun or airplane, but simply bigger and better tanks and, preferably more of them," refers to the battle of Sidi Rezegh in November 1941. How does this compare with our own concepts of armored warfare in the future?

IN the autumn of 1942 the introduction of considerable numbers of Shermans to the Western Desert meant the passing of a phase in tank tactics. In the previous two years tank *versus* tank actions had been accepted as the best answer to an enemy armored attack. The Sherman, with its 75mm high-explosive shell, opened a phase when the legitimate opponent of the tank became not an enemy armored vehicle but an anti-tank gun.

The previous campaigns in the desert, however, had produced two outstanding British tank victories, the Battles of Beda Fomm and Sidi Rezegh.

Beda Fomm

By January 28, 1941, General Wavell's advancing army had invested Derna, about 130 miles beyond Tobruk, which had fallen a week previously.

The advance along the coast was led by the 6th Australian Division, and it was thought that the enemy, retiring before it, intended to make a determined stand in Benghazi. The plan was to maintain pressure on the town itself with the Australians, while the armored force went across country to cut the Benghazi—Tripoli road about 150 miles to the south.

The armored force had arrived at Mekili at about the same time that the Australians were assaulting Derna, and it had been hoped to allow them ten days' rest in order to establish supply depots. Reconnaissance patrols had already been dispatched to examine the projected route of the Division, and on February 2 they returned and described it as "almost impassable." Meantime, an aircraft returning from a flight over Benghazi had reported that the Italians were pulling out of the town to the south. All ideas of rest and maintenance immediately went by the board, and General O'Connor, the Corps Commander, at once ordered General Creagh to "proceed with all speed to prevent the enemy escaping and destroy him as opportunity offers."

It was about 150 miles to the Benghazi—Tripoli road, and a dust storm was developing, but a flying column was immediately formed, consisting of the 11th Hussars, 2d Rifle Brigade and 4th and 106th R.H.A., to push ahead in the lead. It left at first light.

The main force moved off at midday on February 4, and found the worst reports of the going to be true. By 5 o'clock on February 4, the flying column had arrived at and captured Fort Msus and, leaving behind a small guard, pushed on immediately. The main column did not arrive at Msus until 1 o'clock in the morning. Here a brief halt was ordered, and a count of the vehicles showed encouragingly few absentees. Before first light the flying column was again under way and was followed at dawn by the main body. Throughout the morning the Division plunged on, and at 12:40 p.m. great news came from the flying column by radio. The armored cars had reached the road. They reported that traffic was flowing in both directions, which could only mean that the Italians had not arrived. How far back they were along the road was still a mystery, for we had refrained from sending out reconnaissance aircraft for fear of revealing our knowledge of their retreat.

The flying column had not done their journey with much to spare, for exactly one hour and forty minutes after their first patrols had reached the road, the head of the Italian column came in sight. As the guns opened fire on the first lorry to come down the road it skidded sideways and stopped. Behind it there piled up a 10-mile-long convoy of tanks and guns, lorries and motor buses, transporters and motorcycles. The very size of it added to its confusion, for, although the Italians could muster 150 tanks and nearly 230 guns, they never came into concerted action against the tiny flying column. The battle raged all day, and to the main body of the Division, racing to the assistance of its advance guard, came many anxious moments. However, the curious reluctance of the Italians to leave the road for the good going on either side of it, combined with the fact that General Tallera, who was in command of the column, was killed early in the first day, accounted for the Italian failure to break through.

The battle raged for 36 hours, taking the form of

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individual actions between the various components of the enemy column and the extremely active, but well-coordinated movements of the British force. There is no doubt that the Italians were deceived by the effrontery of the armored force into thinking that the British were far more numerous than was in fact the case.

By nightfall of the second day the battle was almost over, but at dawn the following morning the Italians made a last determined attempt with tanks to break through. By 9 a.m. it was all over, and the weary men of the armored division turned to counting their booty. Stretched back along the road in the broken enemy convoy the count showed that we had destroyed 112 tanks, almost 1,500 lorries and 216 guns of all calibers. In addition, we had taken over 20,000 prisoners and smashed the remnants of the Italian army in Africa.

The Battle of Beda Fomm stands out from an outstanding campaign because the armored force engaged was working at the very limit of its communications, and fought a successful action alone and unsupported against a numerically superior enemy. This feat was never again accomplished by either side during the whole of the remaining four years of the war.

Sidi Rezegh

In November, 1941, over two years after the outbreak of war, the Germans were, for the first time, attacked and defeated by the British forces and driven from ground of their own choosing. The material gains of the campaign included the relief of Tobruk; the occupation of a large part of Cyrenaica; and the destruction of approximately 400 enemy tanks, as well as the infliction of a totally disproportionate number of casualties on his unarmored troops.

The spearhead of the British attack, in which the majority of the armor was concentrated, was the 7th Armored Division. At times it became nearer a corps, and it resembled not so much a division as a convenient battle headquarters to which other formations could be attached as it became necessary.

The campign, which lasted for six weeks, can be divided into four phases:

(1) The Battle of Sidi Rezegh.

(2) The defensive phase and the enemy counter-offensive.

(3) The resumption of our offensive around El Gubi.

(4) The pursuit and the capture of Benghazi.

Of these, the two most interesting are the Battle of Sidi Rezegh, with the fierce reactions it produced from the enemy, and the period following close upon it when the enemy spent himself in fruitless counterattacks against our depleted armor.

On November 18, the day on which the advance started, the 7th Armored Division had under command three armored brigades of cruiser and U.S.A. M3 (light) tanks. The tank strengths of these brigades were:

4th Armored Brigade, 166; 7th Armored Brigade, 129; 22d Armored Brigade, 158.

In addition to the 7th Support Group, the Division had under command three armored-car regiments, which were allotted to brigades as follows:

King's Dragoon Guards to the 4th Armored Brigade.
4th South African Armd. Car Regiment to the 7th Armored Brigade.
11th Hussars to the 22d Armored Brigade.

The concentration and approach march of the Division had been carried out with practically no interference from enemy aircraft, indicating that the R.A.F. had gained marked air superiority before the campaign opened.

It had been appreciated that the high ground at Sidi Rezegh, overlooking the main German communications east and west and giving observation over his forces investing Tobruk, was vital to the enemy. The divisional plan was, therefore, to advance on a three-brigade front with the 4th Armored Brigade on the right, the 7th Armored Brigade in the center, and the 22d Armored Brigade on the left. These brigades were to establish a battle position in the area Bir du Meliha—Gueret Hamza—Bir er Reghem, where, it was hoped, they could meet and beat any enemy armor deployed against them. This was estimated to be about 250 German tanks and approximately 150 Italian tanks, provided that the enemy concentrated his available tank strength from all the battle areas.

By last light on November 18, the Division had established itself on its first objectives with the exception of 22d Armored Brigade, who had been delayed refuelling. No major action had so far been fought. On the following day, however, the 22d Armored Brigade (136 tanks) made the first contact with enemy tanks eight miles southeast of Bir el Gubi, and by the evening, after a heavy engagement with M13 tanks supported by Mark IV's and antitank guns, claimed 45 M13's knocked out, though the 2d Royal Gloucester Hussars had suffered about 50 per cent tank casualties.

Meanwhile, the 4th Armored Brigade (165 tanks) had also been engaged with numerous parties of enemy, including tanks, in the area Bir du Meliha, while the 7th Armored Brigade (123 tanks) was ordered to advance and secure a battle position in the area of Sidi Rezegh. At about 1630 hours the 6th Royal Tank Regiment reached the aerodrome at Sidi Rezegh, where they destroyed 19 aircraft on the ground and took 60 prisoners. While this advance was taking place, the 7th Armored Brigade reported a force of 100 enemy tanks moving southeast on its eastern flank. This force was engaged by the 4th Armored Brigade and fierce tank *versus* tank battles continued until last light, when the 4th Armored Brigade count showed 19 enemy tanks definitely destroyed, and a possible further seven.

The 4th South African Armored Car Regiment had by now established observation on the Trigh Capuzzo, and the enemy reactions to the thrust for the high ground at Sidi Rezegh were beginning to become more violent.

On November 21, the escarpment to the north of the aerodrome was attacked by the 1st King's Royal Rifle Corps and 2d Rifle Brigade supported by the 6th Royal Tank Regiment. The attack was successful and the high ground commanding the area was now in our hands. The enemy, however, had no intention of allowing it to remain so, and spent the day attacking the 7th Armored Brigade heavily and continuously from the area south of the aerodrome. By last light the 7th Armored Brigade had been reduced to 40 tanks and the 22d Armored Brigade, which had been ordered northwest to assist the 7th Armored Brigade, had been unable to make its presence felt in time. It had by now become clear that the enemy was prepared to stand very heavy losses in order to regain the escarpment to the north. The main problem on our part was the reinforcement of the Support Group on the high ground, and the defeat of the enemy tank attacks which were being launched from all sides of the aerodrome.

By last light on November 22, the enemy was once more in possession of the aerodrome area, and had overrun the 1st King's Royal Rifle Corps on the escarpment to the north, although he had suffered extremely heavy tank casualties during the day. By nightfall, when the fighting ceased, the British dispositions were:

Support Group: on top of the escarpment south of the aerodrome.

4th Armd. Brigade (approx. 100 tanks): area south of Hareifet en Nbeidet.

22d Armd. Brigade (about 45 tanks): area to the south of escarpment area 4240 (see map).

5th South African Infantry Brigade: area 429398, having attacked the escarpment without success during the morning.

7th Armored Brigade (10 tanks): area 4339, protecting rear of the 7th Armored Division headquarters.

On November 23 plans to assault the southern escarpment were thrown out of gear by a heavy tank attack on the 5th South African Infantry Brigade leaguer. This attack was beaten off and the 22d Armored Brigade (48 tanks) was ordered to reconnoiter the area south and southwest of the leaguer and to engage any treatening enemy tank forces contacted. By midday an artillery duel had established that the Sidi Rezegh ridge was held by the enemy with a large number of guns and at 1330 hours these put down a heavy concentration on the north flank of the South Africans' leaguer, under cover of which an infantry attack came in that was halted only 1,000 yards from the forward troops.

There followed a lull, but at 1530 hours an attack by over 100 tanks was launched from the west and southwest. The 22d Armored Brigade immediately counterattacked in the flank, but were unable to check the advance. The enemy attack was pressed home in spite of heavy casualties, and the leaguer was overrun. Lorried infantry in large numbers followed close behind the tanks, and by last light the enemy was established in the area previously occupied by the 5th South African Infantry Brigade.

The counterattack had cost the enemy over fifty tanks, but for the moment it had deprived us of the commanding ground at Sidi Rezegh. It proved, however, to be the decisive battle, for never again did the enemy attack our armored forces so violently, and never again did he manage to mass such large quantities of tanks. Like our own, his tank casualties had been very high.

In the next phase of the campaign—the defensive and defeat of the enemy's counteroffensive—it became necessary to amalgamate the three armored brigades into one. Almost the first job of the Brigade on December 1 was to go to the assistance of the New Zealand Brigade, who a couple of days earlier had succeeded in reoccupying the high ground at Sidi Rezegh. They were now being subjected to attacks by tanks from both east and west, and the 4th Armored Brigade, in the words of the G.O.C. 7th Armored Division's order, was "to reconnoiter Sidi Rezegh at first light and counterattack enemy tanks at all costs." This task the Brigade successfully performed, escorting the New Zealand Division as it withdrew eastward along the high ground.

During the six days that had elapsed between the withdrawal of the Division from the aerodrome and its resumption of the offensive toward Bir el Gubi, the reorganization and regrouping were carried out behind the armored-car screen, while the offensive was maintained by columns from the Support Group. The enemy appeared to consider that he had gained the initiative, and on November 28, 80 enemy tanks tried to drive a wedge between the 4th and 22d Armored Brigades at Sidi Mutta. He was driven off and appeared to be surprised to find British armor still in such strength, for it was his last major attempt at a counterattack.

Of the many lessons learned in the campaign three stand out. The first was the importance of immediately reinforcing the ground gained by the armor with troops that can hold. Our failure to do this cost us, initially, the escarpment to the north of the airfield at Sidi Rezegh. The second was the masterly cooperation of the German antitank guns with their armor, and the bold manner in which the antitank guns advanced with, or even in front of, the tanks. The third lesson administered by the enemy was that the answer to tanks is neither the mine nor the bazooka, nor the gun or aeroplane, but simply bigger and better tanks and, preferably, more of them.

RUSSIA IN ASIA*

*by Lieutenant Colonel J. V. Davidson-Houston***

I MUST preface my remarks by saying that my description of the history, geography and expansion of Russia will be somewhat sketchy, because time will not allow me to go into all the details, and the country to be covered is most extensive. In most instances the character and policy of a nation is determined by its physical environment, and nowhere is that more obvious than in the case of the Russians. On studying a map of the Soviet Union you will find that the country is hedged about by geographical circumstances. On the European frontier in the early days the Russians were constantly subjected to attacks by Finns, Scandinavians and other enemies from the north and west, and they were cut off from intercourse with Europe and from the influence of Rome. They therefore grew up quite differently from the rest of Europe, which probably partly accounts for their difference in outlook. Later in history the density of population in Europe and the strength of the armies of Central and Western European Powers made it impossible for the Russians to achieve any sort of expansion in those directions. In the north there was the extensive Arctic front covered by the frozen desert known as the *Tundra*, and the sea itself, frozen for a great part of the year. Eastwards, on the Pacific seaboard, the Russians during their expansion have from time to time come up against, first, the Chinese Empire; secondly, the Japanese; and now American sea power. Along the extended southern frontier, from the Pacific to the Black Sea, there is an expanse of desert, semi-desert and mountains.

In addition to this geographical enclosure the Russians have always felt themselves to be hedged about psychologically. In the early period of their development they were subject to constant attack by enemies —in fact, any foreign nation came to be regarded by the Russians as hostile. Even in the time of Ivan the Terrible (a contemporary of Queen Elizabeth), who tried to open foreign trade, merchants who arrived at Moscow were kept outside the city walls in the same way as the Chinese treated European merchants. The obvious reaction to that physical and psychological feeling of being hedged about is, as we saw to some extent in the case of Germany, an attempt to expand to the circumference of the ring and, having done that, to try to break out somewhere.

Expansion

The history of Russian expansion is often regarded as something recent because it is so much in the news at the moment, but it has in fact proceeded ever since the Russians became a nation. It was a case of the flag following trade, and to a great extent it was directed by geography. The map of Russia, both in Europe and Asia, shows a number of great rivers mostly flowing from north to south, or the other way, and connected by the valleys of their tributaries, themselves in many cases navigable rivers. The Russians tended to follow those tributaries of the great rivers, and that gave direction to their expansion. Every now and then they used to come up against a check, and whenever that happened they stopped and began to look somewhere else. Throughout Russian history there has been expansion followed by a check somewhere, and then a change of direction.

I believe the first event in Russian expansion was in 1482, when Ivan III was proclaimed Tsar of all the Russias and for the first time united the various small principalities. He was the Prince of Muscovy, with Moscow as his capital. From that time until Peter the Great, Moscow remained the capital of Russia. As soon as the Russians consolidated themselves into a nation they began to push out the Tartars and to occupy the Tartar kingdom of Kazan to the east, and in 1558 they entered Siberia. Expansion into Siberia was very natural. The Ural Mountains are no physical barrier and Siberia is similar to Russia, a country of vast forests and steppe, through which flow great rivers with tributaries affording means of movement. The Russians also knew that there were furs, gold and spare land to be had in Siberia. The population was primitive and sparse, so the Russians expanded quite naturally eastward across Siberia. They expanded so quickly that less than one hundred years later, 1638, they reached the Pacific. Here for the first time they came up against a Power, the Chinese Empire (then ruled by the Manchus and at its heyday). These objected strongly to the presence of the Russians. There was a good deal of sporadic fighting, and eventually an agreement was concluded in 1689, the Treaty of Nerchinsk, by which the Russians agreed to halt on the line of the Argun River, which flows north and south some hundreds of miles west of the Pacific. The Manchus claimed all the country to the east of that, and the Russians had to be content with the territory to the west. This merely caused a change of direction: the Russians moved northeastwards into the country of the Samoyeds and occupied Kamchatka; they also reached the Behring Sea and crossed into Alaska, which remained a Russian colony until 1867, when the Americans induced the Russians to sell it for a modest sum just before the discovery of gold there.

During this time, although their military expansion into Chinese territory stopped, Russia's political expansion continued, and by means of embassies, peaceful

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**British Engineer Officer.

penetration and exchange of merchandise, the Russians during the next century established themselves very well in China, and there was actually a Russian Mission in Peking long before any of the other European Powers were admitted.

The next direction in which the Russians began to expand was in the Caucasus. In the time of Peter the Great certain explorations and movements were made into the country between the Black Sea and the Caspian, which at that time contained territory belonging to the Persian and Turkish Empires. There was a certain amount to attract the Russians there: the valleys were fertile and there were minerals to be mined. This expansion continued slowly for a long time and was accompanied by campaigns against both the Turks and Persians, which were not consummated until after the Crimean War. The expansion into the Caucasus was a reaction to the failure of the Russians to reach Constantinople by the Black Sea. The British and the French had checked Russian ambitions in the Straits, and as a kind of offset they began to get at Turkey by the back door, for there we could not interfere.

Another direction in which expansion began in the nineteenth century on a big scale was into Turkestan, east of the Caspian. The territories there were under Persian and Chinese suzerainties. The economic attractions were cotton, minerals, and the fact that through that area east of the Caspian ran the old trade routes between China, the Far East generally, Central Asia and the West. At this time there were two Khanates, Khiva and Bukhara, where the Russians found it necessary to assert themselves owing to the fact that their communications and caravans were being constantly raided by warlike tribes. In that part of Asia the Russians have been compelled at various times to subdue lawless peoples which raided their caravans and their peaceful settlers, and having subdued those tribes and made them law-abiding they had to protect them against other tribes which raided them. Thus one thing led to another, resulting in considerable expansion in and eventual Russification of most of Turkestan.

Later in the nineteenth century, having overrun Turkestan, the Russians found themselves up against the borders of Afghanistan and began to experience a check from that direction. Their appearance on the Afghan frontier naturally attracted the attention of the Indian Government. That is recent history. The Russians did, in fact, pause on the Afghan border at the end of the nineteenth century. In the meantime the Chinese Government had grown very weak, and the Russians took advantage of that to push on again in Eastern Siberia; they reached the Pacific coast and thus brought their eastern march to the sea.

In 1898 they leased, from China, Port Arthur and the territory where they built the entrepot of Dalny, the first ice-free ports the Russians had managed to acquire. Between 1891 and 1903 they completed the Trans-Siberian railway, joining Vladivostok to European Russia. That railway had two branches in the Far East, one of which went round the Manchurian border entirely in Russian territory; the other took a short cut straight through Chinese territory. That afforded the Russians a stake in Manchuria itself; it gave them communications to protect and country to exploit by means of the railway. They thus began to take an interest in Manchuria. They developed a branch of the railway south to Port Arthur, where they had established a naval base. After the completion of this railway the Russians experienced another setback because they came up against the Japanese, and the Russo-Japanese War checked their ambitions in Manchuria. The Revolution followed shortly afterwards, which made it difficult for the Russians to achieve any further expansion. There was thus a period of stalemate, but to compensate for this lack of external expansion in the Far East and Europe the Russians began to busy themselves about the central part of their frontier, particularly in Mongolia and Sinkiang, where they were not up against any strong opposition. As they extended their sphere of influence there they also began to develop communications along the long land frontier: they completed the Turkestan-Siberian railway, joining the Trans-Siberian to the Turkestan systems; they established a line of air bases parallel to the frontier and air communication along the whole of the southern border. It is interesting to note that up to the present time, in spite of all this expansion, the total population of Soviet Asia is reckoned to be only 30,000,000 out of a total population for the whole empire of 190,000,000, so that there is no pressure of population to account for this phenomenon.

Motive Forces

With the foregoing in mind, we must ask what were the motive forces behind this expansion. History shows that they can be, broadly, divided into three: desire for protection or security, economics, and out-and-out imperialism.

The security aspect can be further subdivided: the first and most important subdivision being the strategic one. From the defensive point of view the Russians wished to deprive any potential enemy of bases from which to launch an attack on their territory, and themselves to occupy bases convenient for attacking an enemy's territory. At the present time many of the resources of Soviet Russia—such as oil, coal, iron and the newly developed industrial areas—are near the frontier, and it is therefore desirable for them to control the territory beyond the frontier so as to make it difficult for an enemy to threaten these resources. In addition, the Trans-Siberian railway and the Turkestan railway run near the border practically the whole of their way. In modern times the development of air attack and long-range weapons, such as rockets, makes it desirable to control territory farther and farther away from the centers of industry and population. In fact, there is no end to the range which one can claim to bring under one's

control in these circumstances.

A second method of protection is to induce one's neighbors to be friendly or to be puppets, and the Russians have adopted those principles. Where they have not actually occupied a country with their armies they have encouraged the setting up of Communist Party governments or frightened the existing government into being friendly.

The third method of protection has been ethnic. Practically the whole way along the Russian land frontier the population on each side are of the same stock, and the Russian is a good assimilator. Since he first started to expand he has never had any racial prejudices or color bar; he has always mixed with the people—Turkoman, Tartar or whatever they might be—and he has been very successful in Russification, so that the population of the Soviet Union is far more homogeneous than that of the British Empire. This assimilation has a certain value offensively and defensively; if people on the other side of the frontier can be brought to think in the same way as those on the Soviet side it affords a zone of influence—as, for instance, in Persian Azerbaijan; it also encourages attempts to control the territories beyond the frontier, so that the Soviet people will not be influenced by their kinsmen on the far side.

Then there is the system of economic zones. When the Russians trade with a neighboring country they usually try so to dominate that trade that it is conducted to their advantage. There is also the question of protection of trade routes. As I have said, the Russians in their early days often had to subdue tribes who raided their trade routes or nations who threatened them, and, having pacified these, they had to protect them by dominating somebody else. That is not so important at the present time. The chief economic interest the Russians now have is to dominate or control the trade between their country and neighboring countries.

Another economic desire is to obtain ice-free ports. Geography has given Russia ports which are closed part of the year by ice, and she is always trying to find outlets to warm seas which will be open all the year round without the use of ice-breakers.

Lastly, there is simple imperialism, the idea of expanding wherever the soil is propitious. That went on under the Tsars, and it appears to be going on today. It is partly a question of prestige. The Soviet Union does not want to occupy an area smaller than the Tsar's Empire, and in late years has turned its attention to territories lost during the Revolution.

The Asian March

Let us then look along the Asiatic frontier and see what is going on there, what expansion is taking place at the moment, and what is the likelihood of attempts at future expansion.

Manchuria.—The present frontier is the Amur River—an ethnic frontier, not an economic one. Rivers are nearly always bad frontiers, because the economy of a country builds up on both sides of the river. But this is an ethnic frontier in that the population to the north is overwhelmingly Russian owing to colonization; while to the south is overwhelmingly Chinese, also owing to the colonization which took place during the nineteenth century. In this case the Russians cannot claim to have fellow-countrymen on the far side. On the other hand, the Amur River is a great trade route, navigable by steamers, and is not a good frontier from that point of view; both banks really belong to the same unit. Russian interests in Manchuria are both economic and strategic. There are coal mines and unexploited minerals; there is a tremendous soya bean output; and there are hides to be had from the considerable stock of cattle there. Manchuria also offers a number of ice-free ports—Port Arthur, Newchwang and Dairen in the south; Vladivostok, although on the same latitude as Madrid, is only kept open by ice-breakers in the winter. The Russians have also communications to defend; there is a railway running through Manchuria which they wish to be sure is free from threat by any other Pacific Power. We have seen during the last few months, that the Russian troops which entered Manchuria at the end of the Japanese war have been induced to withdraw, but as the Central Chinese Government forces come into Manchuria to take over they find themselves opposed by Chinese Communist armies who seem to be taking the place of the Russians.

Korea.—To the south of Manchuria is Korea. The frontier between Korea and the Soviet Union is a short one, the estuary of the Tumen River. The Russians are obviously interested in Korea because it would round off their eastern seaboard and make it difficult for any other Pacific Power directly to threaten Vladivostok or Manchuria from that side, and it forms a right flank to their Far Eastern possessions. Again, Korea has some well-developed warm-water ports, particularly Seishin and Rashin, which the Japanese were completing just before the war. Again, Korea has never in modern times governed herself; she was first under Chinese and next under Jap suzerainty, and has not since set up any satisfactory government of her own. The country is occupied by Russian forces in the north and American forces in the south. The Russians in their zone have been encouraging the Korean Communist Party, which I should say is much better organized than any party in the American zone and may eventually, when the Russians and the Americans remove their troops, achieve considerable influence in the polity of Korea.

Outer Mongolia.—West of Manchuria we come to Mongolia, a neighbor with a hilly but not difficult frontier, including the Gobi, which is desert in parts but elsewhere supports considerable herds of cattle, sheep and ponies. There the Russians possess the advantage of having the Buryat Soviet Republic just north of the frontier, where the population is of similar stock to that in Mongolia itself. Communications are well developed; there is a railway running from the Trans-Siberian line to Urga, now called Ulan Bator Khoto, the capital of Outer Mongolia. Russian inter-

ests in Outer Mongolia are partly economic; there is a well-developed trade route which is motorable right across Outer Mongolia into North China; there is also considerable pasture for sheep and cattle; there are many unexploited minerals. Another attraction is the fact that Outer Mongolia affords a kind of cushion to Siberia; it is a protective zone to the Trans-Siberian railway in case any hostile Power tried to operate from North China. Mongolia has always been technically under Chinese suzerainty, but the Russians had considerable interests there long before this present century began, and during the Revolution they were afforded an opportunity to intervene in the country because a White Russian force had entered Outer Mongolia and occupied Urga. The Red Army came in, destroyed the White Army, set up the "Mongolian People's Republic" in 1921, and the country was organized on Soviet lines with Russian troops to see that it remained so. It is now an independent state, with strong pro-Russian leanings. It is not possible, however, to get into Outer Mongolia from any direction except under Moscow's sponsorship. I have tried, and have been told, "You can do it only by applying to Moscow," well knowing that such an application would be met by the argument that Mongolia is an independent country and that reference must be made to Ulan Bator, where Great Britain is not represented. Russian influence over Outer Mongolia is going to have repercussions on Inner Mongolia, which has hitherto been much more under Chinese influence than Outer Mongolia. Now that Chinese Communist troops in North China have set themselves up in Inner Mongolia there may be a pro-Russian sphere of influence right down to the Great Wall on the borders of China proper.

Tannu Tuva.—At the northwest corner of Outer Mongolia there is an interesting little country called Tannu Tuva, of which most of us had not heard until recently; it is very mountainous and about one-third of the size of Germany, with a small population. Its only link with the outer world—that is, the U.S.S.R.—is either by air or along the valley of the Yenisei, a river runing toward the Arctic. The population is Urian-Khai Mongol, akin to the Buryats of the Soviet Union. The chief Russian interests in the country are the considerable livestock grazed there and the fact that it stands in a central position between Mongolia, Chinese Turkestan and Soviet Asia. It was set up as an independent "republic" under similar conditions to Outer Mongolia, and even issued its own stamps. But quite recently it has become a province of the Soviet Union, apparently at its own request.

Sinkiang.—Farther west we come to Sinkiang (or Chinese Turkestan). The frontier is mountainous and the country in the north of Sinkiang is quasi-desert, but communications with Russian territory have been improved considerably by means of the Turg-Sib railway and the road across the frontier to Urumchi the capital. The distance from Sinkiang to the trade centers of China is so much greater than to Siberia or to Russian Turkestan that trade naturally tends to flow to and from the U.S.S.R. rather than China. Sinkiang has therefore long been subject to considerable Russian influence. The population of the country is mainly Turkoman, similar in race to the people of Russian Turkestan; there are also inhabitants of partly Chinese origin called Tungans. Periodically there have been Moslem risings against Chinese rule, of which the Russians have been able to take advantage by sending in troops and occupying parts of the country. During these operations they succeeded in detaching a piece of Chinese Turkestan in the neighborhood of Lakes Balkhash and Issik Kul, which during the last century was made part of the Russian Empire; but there is no ethnic frontier and the Turkoman-Moslem population flows over both sides of the political boundary. The chief interests, besides trade, are considerable resources of minerals not yet fully exploited but which may possibly yield results if the Russians are able to develop them. Russian influence in Sinkiang has an inevitable effect on India because there is a trade route over the passes into Chitral, where recently it has been reported that Russian piece-goods are to be found in the bazaars. Indian merchants in Sinkiang have been suffering as a result of the increase of Russian predominance over the last twenty years or so, so that we could not be indifferent in India to Russian ascendancy in Sinkiang.

Afghanistan.—Farther west again we come to Afghanistan, the frontier of which is partly the River Oxus (again not a very good boundary) and partly a line of mountains. It is not the ethnic frontier, because in Northern Afghanistan there are Tajiks and Uzbeks, who are kin to the inhabitants of Soviet Tajikistan and Uzbekistan. The ethnic line is the Hindu Kush, a range of mountains running northeast to southwest, south of which the people are Pathans with no ethnic connection with the Soviet Union. Russian interests in Afghanistan until recently have been entirely strategic, because occupation of Afghanistan puts them on the frontier of India, and, on the other hand, they affected to believe that the British had ideas of threatening their territory through that country. There are now signs that the minerals of Afghanistan, particularly oil, are interesting the Russians. They have developed communications into Afghanistan by two main routes: one is from the region of Tashkent on the Turk-Sib railway to Termez on the Afghan border, from where there is a road through Balkh to Kabul and so into India; the other route is from Merv, also on the Turk-Sib railway, to Herat. Herat is a center of communications with Persia, Baluchistan and India. One can thus see that if we withdraw our forces from India and cease to direct Indian policy we should not be able to help Afghanistan, and Afghanistan by herself is unable to offer effective opposition to pressure from Russia. It is thus most important that under present conditions in India the Foreign Office should take over from Delhi control of our relations with Afghanistan.

Persia.—Perhaps the most interesting country at the

present time is Persia, the frontier of which has been moved back and back for a number of generations. Much of the territory in the Soviet Union was part of the Persian Empire. The frontier at the moment follows the Araxes River west of Caspian), the southern shore of that sea, and roughly the line of the Atrek River to the east of the Caspian. The population in the north of Persia is similar to the Soviet inhabitants in the south of the Union. On the west the Armenians lie opposite the Armenian Soviet Republic, the Azerbaijani are neighbors to the Azerbaijan Soviet Republic, and the Turkomans live next to the Turkmenistan Republic, which makes it easier for the Russians to assert their influence in North Persia. The Persian proper does not come up to the frontier; his home is in Middle and Southern Persia. The chief Russian interests in the country, besides its races, are oil and grain. Moscow has recently succeeded in achieving an agreement regarding North Persian oil by putting pressure on the Persians. The oil fields of the Caucasus are believed not to be yielding as much as they did and the Russians therefore want new sources of oil in the same part of the world. Most of the grain of Persia is grown in the north; if, therefore, they were able to assert themselves in North Persia the Russians could put pressure on the whole country. They would like to control the southern Caspian shore to give them east-west communications and avoid sea journeys across the Caspian. Again there is the ever-present lure of warm-water harbors. In South Persia there is the newly developed port of Bandarshahpur, joined with the Caspian by the Trans-Persian railway, both of which were completed shortly before the late war. If, therefore, the Russians were able to secure special rights in ports on the Persian Gulf they would find the Trans-Persian railway available for their use. Among the methods they are adopting at the moment is that of seeking the sympathy of the border races, and I note that they have been encouraging the establishment of a Kurdish autonomous government, although there are no Kurds in the Soviet Union itself. The significance of this is that there are Kurds in Asia Minor and in Iraq. Therefore the establishment of any sort of Kurdish government in Persia would have an effect in Northern Iraq and in Eastern Turkey. Again, there is a political party in Persia called *Tudeh*, which appears to be organized rather like the Communist Party. Its point of view has openly been expressed as anti-British and pro-Russian. It is not a racial organization: it is a general political party which has a certain amount of influence in all parts of Persia. The withdrawal of our forces has left Russia with relatively greater influence, and the Anglo-Iranian oil interests in the south are without any protection other than international good will. It is significant that the company is having labor troubles fomented by the Tudeh Party.

Turkey.—The last country on our tour is Turkey, whose frontier with Russia is the Caucasus, always unstable because the people in the area are neither Turks nor Russians. The Russians have been advancing in that area for generations; in 1878 they occupied Kars and Erzerum and in 1886 they occupied Batum on the Black Sea. Recently the Russians have been putting considerable pressure on Turkey; an article in a Russian newspaper even argued that certain areas should be given to Russia because they are ethnically Georgian, and, although the Georgians are not Russians, there is a considerable Georgian population in the Soviet Union. The object all the while has been to obtain a warm-water port. Constantinople and the Straits lead to the Mediterranean and the sea lanes of the world. We have heard of the demands for influence in Tripoli and the argument over the port of Trieste. If the Jugoslavs controlled Trieste, their friendship with Moscow would give the Russians facilities in the Mediterranean. Pressure has also been exerted in Bulgaria, where the concentration of Russian troops caused a certain amount of alarm to the Turks in Thrace; again, any Kurdish national movement is bound to have repercussions on Turkey's eastern territory.

Conclusions

I suggest that the Russian land frontier in Asia has consistently shown itself to be unstable and that the expansion of Russia can be attributed to three motive forces: first, an exaggerated desire for security against a possible enemy; secondly, the tendency to assimilate neighboring peoples and, having assimilated them, to take an interest in any other cognate peoples across the frontier; thirdly, economic and political imperialism, one of the strongest factors in which is the desire for ports on the open sea lanes of the world. There is another factor which I think needs further investigation, and that is the possible desire to keep considerable parts of the Russian armies abroad for a few years rather than bring them home and make recovery more difficult.

I think we can conclude that the expansion does not arise from any need of living space; the Russians have plenty of that. Their economic needs appear to be somewhat exaggerated. Perhaps we can yield that in Persia the desire for oil is natural because the Persian oil fields are in the same area as the ageing fields worked by the Russians and would be most convenient to the Soviet Union, as would the resources of other minerals not yet thoroughly exploited.

It must be remembered that all these countries from the Pacific to the Black Sea are weak, and have depended in recent years on the backing of Great Powers to prevent any encroachment on their territory. Unless the Great Powers take an interest not only in what happens near home but also in the whole of Asia, the Russian expansion is likely to continue. One of the main difficulties arises from *faits accomplis*. Once an area is occupied, or a sphere of influence is established, it is much more difficult to take steps than if something had been done to prevent or foresee the event. Who is going to do anything about Tannu Tuva now, even if he wished to?

THE LIPPIZANERS*

Royal Horses of Austria

by H. H. Douglas

PART I

WHEN the late General George S. Patton, Jr., restored the Lippizaner horses to Austria in the summer of 1945, he gave back to their rightful owners the purest strain of a breed that, both historically and zootechnically, is without doubt the most remarkable in existence. Especially bred since 1580, Lippizaners have taken their place in practically every horse raising establishment in Europe, particularly in Austria, but also in Hungary, Germany and other neighboring countries. For centuries they were the riding and carriage horses of Austrian Royalty, and they made famous, and were made famous by, the Spanish Riding School (Spanische Reitschule) in Vienna.

The first Lippizaners to tread the soil of the western hemisphere arrived in California on January 5, 1937, at San Pedro, the port of Los Angeles. These horses, two pure white stallions and two mares, were the gift of a grateful Austrian Government to Maria Jeritza, who sang at the State Opera House in Vienna during a period of severe financial stress, and waived her fees. She also assisted numerous students to continue their musical educations, which would otherwise have come to an end. The ranch of the late Winfield Sheehan, then husband of Mme. Jeritza, at Hidden Valley, Camarillo, California, near Los Angeles, has since been the home of these Lippizaners and their offspring. One of these stallions, *Pluto II*, played the part of *Florian*.

The second group of Lippizaners to set foot on the soil of the United States arrived in the fall of 1945 under the auspices of the Army Remount Service. They were but a small part of a shipment of Thoroughbreds, Arabs and Halfbreds that had been selected from the cream of the horseflesh in Germany by Colonel Fred L. Hamilton. But the Lippizaners were not German; they were mostly Hungarian, as was the case with about half the horses brought over by the Army from Germany. A few of the Lippizaners were Austrian. Back in 1944 the Hungarian and German governments made an arrangement for the transfer of a large number of Hungarian horses to Germany, to keep them out of the hands of the advancing Russians. The entire shipment included about 600 horses from Mezöhegyes, 300 from Kisber, and 300 from Bábolna, the principal Hungarian Lippizan Stud, which has also been famous for its beautiful Arabians. In November 1944 the shipment left Bábolna. Of the 300 horses approximately 100 were Lippizans, including six stallions, with the remainder about equally divided between mares and colts.

The entire shipment of 1,200 horses, accompanied by the Hungarian Minister of Agriculture and a group of staff officers from the Hungarian Cavalry, was taken to an unoccupied remount station at Bergstetten in Bavaria, near the village of Donauwörth on the Danube River not far north of Augsburg. When Major James P. Owens, of the American Army, took over Bergstetten on April 25, 1945, every horse that had been brought from Hungary, plus numerous younger arrivals, was still there. The Germans used a surprising number of horses in World War II, and hence must have previously had a considerable supply to draw from.

After V-E Day many of the tough Halfbred horses from Mezöhegyes were distributed throughout the countryside by Major Owens for the use of the German farmers. Some of the Bábolna Lippizaners were also farmed out. From those remaining at Bergstetten Col. Hamilton made his selections for shipment to the United States. He picked two stallions and four mares. Authentic though they are, as part of a breed that goes back for more than 350 years, the United States Government got none of the Lippizan *aristocrats* when Col. Hamilton picked out the nine horses at Donauwörth.

From among the Austrian Lippizaners previously brought from Hostan, Czechoslovakia, to Mansbach, Germany, Col. Hamilton selected the stallion *Siglavy-Virtuosa* and the mares *Saffa* and *Madera*.

While several colors have gone into the breeding of the Lippizaners during the past centuries, white is the predominant color, and every horse reared at Lippiza destined for the Imperial Court at Vienna had to be of the purest white. Bay, brown and black, as well as

The Horse, July-August, 1947.

gray, still exist, but all of these have sprung from the less pure lines bred in dozens of state and private studs throughout Central Europe. At nearly every stud farm from the Swiss Alps to Fogaras in Transylvania, Radautz in Bukowina, Holitsch and numerous others in Galicia, Lippizan stallions have been maintained. Outside of Austria, though the Hungarians have bred many elegant Lippizaners, as is evident from the prize-winning four-in-hand shown here, they were used chiefly for the rejuvenation of the native stock rather than for the breeding of a pure line, and these crosses have always been extremely popular and hardy.

Hungary, as a nation highly dependent upon the horse for power and locomotion, and for a long time part of the Hapsburg Empire, was naturally deeply interested in the Lippizans. Many of the more important Hungarian state studs were established during the 18th century to bring about better breeding, and sooner or later they almost invariably maintained a Lippizan section. This was particularly true of Radautz (established in 1729), and Bábolna (1789). The latter, though independent since 1806, was established by Joseph II as a branch of Mezöhegyes (1786), and has been known as a dual stud—Arab and Lippizan. The Bábolna and other Hungarian Lippizans have always been much more mixed than the Austrian Lippizans, and were bred with the idea of supplying a rugged horse for the needs of the poorer, more barren mountain and upland districts of Hungary which could use neither the exacting English horse nor the excitable Arabian. The Hungarian Government really took over the management of the larger stud farms about 1868, and it was for the above reason that Fogaras, established in 1874 in the valley of the Olt in mountainous Transylvania, was originally stocked with 94 Lippizans and 16 Siebenbürgers. This resulted in the *Incitato* line, which was transferred to Bábolna in 1918. The influence of the breeding done at the Hungarian state studs had really begun to be felt about 1816. Kiszer, only two or three miles from Bábolna, west of Budapest and south of Komorn (Komarom), was established in 1853-54, but no Lippizans have ever been bred there. Nor has Mezöhegyes, Hungary's military stud and its oldest state stud, founded by Joseph II to supply cavalry horses to the Hungarian army, ever bred Lippizaners.

Of the three Lippizan stallions selected by Col. Hamilton, one of them, the eight-year-old *Maestoso XXVII*, is a bay horse with four white feet and a narrow white blaze from ears to nostrils. *Pluto XX*, twelve years old, is a white horse flecked with tiny black spots. His Roman nose is a marked characteristic of the Lippizans. The five-year-old *Siglavy-Virtuosa*, to all appearances more Arab than Lippizaner, is light gray, with a dark tail and mane. Of the six mares four—*44 Favory XVII*, *48 Favory XVII*, *89 Maestoso XX*, and *Soffa*—are flecked with black spots. *Madera* is pure white, while *65 Maestoso XX* is nearly pure white.

For the same reason that Lippizaner stallions were used so extensively throughout Central Europe for the strengthening of the native stock, two of the Lappizaner stallions of the Remount Service have been placed with private breeders in the West for service to any who desire it at a stud fee of not more than twenty dollars. *Maestoso* is now in the hands of Mr. George Shadbolt, Merriman, Nebraska, while *Siglavy-Virtuosa* is in the hands of Mr. Joe Grote, Dayton, Washington. *Pluto*, at the Pomona, California, Remount Station, is available on the same basis. The six Lippizaner mares are now at Fort Reno, Oklahoma. Since horse cavalry became almost nonexistent in the United States Army during World War II, and since the function of the Remount Service has now become more agricultural than military, it is expected that all Government horse breeding activities will soon be transferred to the Department of Agriculture.

The Lippizaner horses derive their name from the tiny village near Trieste where their breeding began in the year 1580. Lippiza is located in the Karst region about eight miles directly east of Trieste, at an altitude of about 1,400 feet.

Under the hands of the builders of Lippiza the stud became a veritable oasis in a sea of rocks and more rocks where, though the climate was generally mild, the summer sun was very hot, and where in winter the animals suffered under the blasts of the northeast wind known as the "Bora," which sometimes continued unabated for two weeks at a time. The cold, especially for the foals, necessitated great attention and care, while from both the sun and the wind the forest offered a certain measure of protection. In contrast to the "Bora," the warm "Scirocco" wind from the south, from the deserts of Africa across the Mediterranean and Adriatic, had an enervating effect upon both men and animals.

Every year the humus from the Dolinen was spread over the meadows to fertilize the hay crop, and the horses were kept in the stables or on the wild pasture land until the hay was harvested. The annual hay crop produced less than one hundred tons of excellent fodder, and as it was not enough, hay had to be brought from Prestranek, the branch stud to the east, which was surrounded by many mountain meadows.

The whole territory of the Karst suffered a shortage of water. Lippiza had but one spring, and since wells were unsuccessful, it was necessary to build cisterns in which rain water was collected from the roofs to be used as drinking water. It was sufficient for the Stud and was equally good for man or beast. Water for the animals was also collected in troughs or tanks, which were, in effect, large Dolinen, cemented, in which the rain water collected.

The Royal Stud of Lippiza was founded near the end of the 16th century by Archduke Karl of Steiermark, son of Emperor Ferdinand I. Previously, as a deserted village, it was the property of the Bishop of Trieste, from whom it was bought for the establishment of the Stud on May 19, 1580. The attention of the Archduke

was probably attracted to this waste region by the horse breeding practiced in earlier times in the neighborhood of Aquileia, and at the sources of the Timavos River, near Monfalcone, which roars through the Karst region as the Rieka, disappears underground for twenty miles, and emerges as the Timavos. It crosses the Istrian Peninsula in a southeasterly direction to enter the sea at Fiume. Venetian history mentions the Timavos and the environment of the area. On its banks a temple to Diomedes, patron of horse breeding, was said to have been built and surrounded with a holy grove in which fast horses were bred. From this region the Roman rulers took their horses. The stallions of the region were also used in the Middle Ages. Because of their energy, speed and flexibility, they were preferred for the war service and were also excellent as tourney horses.

The horses originally used for breeding in Lippiza were of Spanish origin, as well as certain of the fine Oriental type "Karst" horses native to the area. The proud Andalusian, the historic, noble Spanish horse descended from Moorish blood, was bred at the "Carthusian-Monk" Stud near Jerez in the Province of Cadiz. From there, and from Aranjuez, were taken the magnificent high school, coach and riding horses for the Court of Isabella. The best horses of Spain were bred along the Guadalquivir, in the region of Cordoba, Sevilla and Cadiz—the home of the regal Andalusians.

The black Andalusians were a pompous and showy breed, particularly well liked in an age when everything was sacrificed to outward appearance. The Spanish horses were high-steppers, naturally adapted for display and trick riding. It was because of this, as well as for their fiery and distinguished natures that, in 1580, Freiherr von Khevenhüller was dispatched to Spain to buy breeding horses for the foundation stock of Lippiza. He brought back three "Brincos-Pepinier" stallions which were followed a year later by six more outstanding stallions and 24 brood mares. Other shipments of Spanish horses arrived at Lippiza in the years 1582 and 1584. At that time the Spanish horses were divided into two types: The heavy, but noble, type, the so-called "Villanos," which had much to do with the later development of the strong, faultlessly developed and placed legs of the Lippizaners. The second, a much lighter type, graceful, noble horses called "Genetten," were harmoniously proportioned high-blooded animals.

In addition to the Andalusians, six white Arab Barbs, and later some Danish horses, were imported, as well as Upper Italian horses already possessed of some Spanish blood. These came particularly from Polesina, near Verona and Rovigno, on the lower reaches of the Po and the Etch. The large, showy, festive-gaited Neapolitans, introduced somewhat later, were of excellent structure and elegant movements, being especially fitted as riding and carriage horses. Among the stallions used in the early breeding the Stud had the good fortune to possess animals of unusual breeding power which, through careful culture, have handed their names down to lines still flourishing—*Pluto, Favory, Maestoso, Neapolitano* and *Conversano.*

Baron Georg Rupprecht von Herberstain took over the original establishment and management of the Stud; shelters and stables were rapidly erected for the horses; cisterns and tanks were built, and the soil made productive, after being laboriously cleared of endless rocks, by fertilizing with humus from the Dolinen. Oats were secured from Mitterburg, and hay from Adelsberg (about 15 miles to the northeast).

The enlargement of the Stud was accomplished under Leopold I (1657-1705), and Joseph I (1705-1711), but as a growing and flourishing institution it had always to contend with the meagerness of the soil. On June 19, 1728, under the government of Karl VI (1711-1740), the Cloister Prestranek ("Pröstranegg"), about fourteen miles to the east and slightly north of Lippiza, was bought and established as a branch of the Lippiza Stud. To this estate belonged large mountain meadows which produced nourishing hay for Lippiza. About the same time the Stud was enlarged by the purchase of the Adelsberg establishment, just a short distance north of Prestranek.

The breeding of the noble horse of the Imperial Stud exerted a strong influence on the breeding of the rest of Central Europe. Nobility and cities established studs for which Lippiza, especially, furnished the breeding stock.

Under the government of Joseph II (1780-1790) the continuation of the Stud was seriously menaced. For economic reasons the proposal was made to terminate the Lippiza Stud and move it to Galicia. Fortunately this was not done.

In the period after the government was taken over by Franz I (1792-1835) there were stormy times. The Stud was evacuated three times as the French armies approached. It was transferred twice to Hungary and once to Slavonia. During the period from 1809 to 1815 the entire Karst Royal Stud was transferred as a "gift" to Marshall Marmont, and moved bit by bit to Hungary in the neighborhood of Arad. It was later returned to Austria. In 1829 the riding horses of the stud were incorporated into the Koptschan Stud near Holitsch, north of Pressburg. Altogether the Stud spent six years on foreign territory. During this period Lippiza was either occupied by the French Army or farmed out by Napoleon to private individuals at a yearly rental of 25,000 francs. Even now two French stone eagles adorn the gate posts at the entrance.

The period was a great trial to the Stud, and when in 1815 the order came from Vienna, "Return to Lippiza," it was high time. In the following quiet epoch the breeding stock was even more highly selected, and they gradually succeeded in eliminating the evidences of the years in exile.

(To be concluded)

Armored Division Associations

1st Cavalry Division

Under the personal supervision of Major General William C. Chase, Commanding General of the 1st Cavalry Division in Japan, a history of the 1st Cavalry Division in World War II is being compiled and printed in Tokyo for free distribution to all members of the 1st Cavalry Division Association and all other members of the Division who wish to join the Division Association. Some 25,000 former members of the Division are being solicited for membership in the Association and will automatically be entitled to a copy of the history as well as a directory of Association members.

Of particular importance is the gathering together of the correct addresses of the families of men of the Division who were killed in action, died of wounds, or have since passed away. Any such address should be sent to the office of the Association Registrar.

The first local chapter of the Association has been established in El Paso, Texas, by Colonel Chester Chambers, former Division Quartermaster, and Colonel Roy Lassiter. The purpose of this and other local chapters to be established is to focus attention on the activities of the Association, enlarge the membership, develop plans for local reunions and smokers when a reunion of the entire membership is not feasible, and to generally foster the friendships formed in combat.

General Jonathan M. Wainwright, the hero of Bataan, has been extended honorary membership in the Association. He at one time commanded a brigade in the Division.

Chaplain Charles V. Trent, formerly of the 5th Cavalry and now a resident of Winfield, Kansas (1105 East 7th Street), periodically publishes a Newsletter for known members of that regiment.

Major General Verne D. Mudge, former Division commander and now retired, who is currently a member of the Professional Advisory Staff of the Senate Armed Services Committee, has been in California recently conferring with the Association Registrar in regard to reunion plans, general membership campaign, the establishment of local chapter groups such as have been developed in El Paso, and a special meeting at Fort Bliss, Texas, on November 8, 1948, which is the 100th anniversary of the establishment of that famous Army post.

Colonel Edmund P. Stone is registrar of the Association and all correspondence should be addressed to him as: Registrar, 1st Cavalry Division Association, P.O. Box 201, Pomona, California.

1st Armored Division

Organization of the First Armored Division Historical Association is progressing rapidly.

The Washington, D. C. Branch started to get organized on May 1, 1947. Paid-up membership on August 1 was 44; on September 1, 122. Colonel Peter C. Hains, III, is president of the Washington, D. C. Branch. In Kentucky, the Fort Knox Branch has been organized with Colonel Maurice Daniel as president. In Kansas, Lieutenant Colonel Bogardus S. Cairns, at Fort Leavenworth, is gathering the 1st A. D. clan together. In New Jersey, Bill Prati, 413 Prospect Avenue, Asbury Park, and Richard K. Van Nostrand, are working on the organization of 1st A. D. veterans who now live in that state.

The Association is seeking to establish active representatives in every state, preferably men now in civil life. The idea is to round up all 1st A. D. veterans as members of the Washington, D. C. Branch initially; and subsequently to establish state or regional branches as soon as membership in a particular area is strong enough to form a separate self-supporting organization, with its own officers, committees and activities.

Plans for the preparation and publication of the 1st A. D. history are taking more definite shape. The Division Historian, Colonel C. C. Benson, has submitted to various members of the Association the following tentative outline of the proposed historical works:

Part I. Activation to North Africa.
Part II. Operations, Bivouacs and Battlefields in North Africa.
Part III. Operations, Bivouacs and Battlefields in Italy.
Part IV. Cease Firing to Inactivation.

Appendices:

1. One for each battalion or higher unit, giving a brief factual history of the unit, including battle honors and unit citations.

2. Individuals cited for Legion of Merit, Silver Star or higher awards.

3. Individuals who died in service or were Listed as Missing in Action.

4. Statistics—days in combat, casualties, replacements, prisoners captured, rounds fired, etc.

All concerned are requested to revise and amend the above outline, so that the membership of the Division Association will get what they want.

The members of the 1st Armored Division Historical Association desire to express their appreciation of the valuable services rendered gratis by the ARMORED CAVALRY JOURNAL.

3d Armored Division

On Friday, August 15th, 300 New York and New Jersey Spearheaders met at the Park Central Hotel in New York City for the first get-together there. Dr. Prigott, Joe Napoli, Morris Goldner, Harold Axel, Charlie Webb, Harry Tarzian and Pete Sweda, the temporary committee appointed to arrange the dinner are certainly to be congratulated. They arranged to obtain the colorful Cocoanut Grove Room on the 26th floor, with a bar conveniently set up just around the corner. About 7 P.M. the Spearheaders adjourned from the Mermaid Room on the first floor and went up to start their party; by 8:30 all were present and called to take seats by Dr. Prigott, who acted as Toastmaster.

After introducing Colonel Smith, Jack Welborn and Chubby Doan, the Secretary of the Association, he called on Joe Napoli for the first number of the floor show. Jinx Falkenburg, accompanied by her husband, Tex McCrary, gave us their line of patter. They tried to kid General Hickey but soon found they were outsmarted.

After this dinner was served. It was a very excellent banquet. After the dinner additional entertainment was furnished by Nick Kenney, who acted as Master of Ceremonies, and Vic Damone, star of "The Saturday Night Serenade" and future replacement for Frank Sinatra. Vera Barton, CBS star, and James Barry from the Havana-Madrid and La Conga also entertained with songs. Ray Palmer was at the piano.

After the visiting stars had put on their show General Hickey made the main speech of the evening. He was enthusiastically received by the New York Spearheaders. Following General Hickey a short business meeting was held. A motion was made from the floor to continue the present set-up of temporary officers of the New York chapter in office until after the national convention is held this fall. This was unanimously carried. President, Dr. Aaron Prigott, Captain Charles Webb, Harold Axel, Joseph M. Napoli, Harry Tarzian, Peter Sweda and Morris Goldner.

Despite the fact that this was the hottest day of the season in New York a holiday spirit prevailed and all enjoyed the reunion very much. According to reports, the last twenty "diehards" were thrown out of Greenwich Village about 6:15 A.M.

The Secretary of the Third Armored Division Association has announced that at the time we went to press the last of the votes of the Association members on where the first annual reunion will be held were being received. As soon as the votes are counted the members will be informed of the choice made. At this time it seems quite certain that it will be either Chicago or New York.

It is hoped that complete plans can be made in time to have the annual reunion in the selected city during the middle of November of this year. A publicity campaign is being prepared so that every Spearheader will be sure to hear about the reunion. We are counting heavily on all members to give us every assistance in publicizing the reunion when the date and place are announced.

* * *

5th Armored Division

At its meeting on August 7, the Chicago Chapter approved in final form the main items of business to be presented before the Division Convention and then elected officers to head the Chicago Chapter for the coming year.

Officers selected were:

President, Ed Murphy (22)
Vice President, Fred Sustik (Div. Hq.)
Secretary, Lou Filas (22)
Treasurer, Ed Hawkins (127)
Service Officers, M. E. O'Malley and J. J. Newhouse (CIC)
Chaplain, Rev. Kolberg (CCB)
Sergeant-at-Arms, John Lukanitsch (10)

Elected to the Executive Board were Philipsborn (CCB), Entrekin (Div. Hq.), Kellner (Tns.), Schoen (71) and Kriza (127).

With the assistance of legal talent available in the Chicago Chapter, the Fifth Armored Division Association was formally incorporated under the laws of the State of Illinois on August 5, 1947.

Enthusiasm is running high among former Fifth Fighting Men in the Minneapolis-St. Paul area. They now have over a hundred names of residents in that area as the result of a meeting early in August. Many are sending in addresses of friends in near-by localities.

Those who attended the first meeting to start the ball rolling were: William H. Anderson, Gordon J. Benson, Robert M. Berglund, John H. Brown, Gerald E. Flattem, Stanley C. Krueger, Theodor A. Malaske, Walter J. Marohn, Arnold S. Moberg, George L. Person, Stephen O. Sherry, Leonard D. Tauber, Loren Woolsey, and M. F. Jordan whose address is 14 Oak Grove, Apt. 102, Minneapolis.

Over 1,000 members and wives of the Fifth Armored Division Association gathered in Chicago for their first annual convention August 28-29 at the Congress Hotel.

Cleveland was selected as the site for the 1948 convention with Labor Day week end as the probable date.

As an expression of their affection and gratitude, the members of the Fifth Armored Division Association presented to Major General Lunsford E. Oliver, former Division Commander and outgoing Association President, a handsomely lettered parchment scroll. Presentation was made during the luncheon of the Division Convention on August 28th. The scroll read as follows:

"Presented to:—

MAJOR GENERAL LUNSFORD E. OLIVER

by his comrades-in-arms, the former members of:—

THE 5th ARMORED DIVISION

in gratitude for his courage and leadership on the field of battle and in time of peace; to acknowledge his

earnest and unstinting care for his officers and men; to mark our realization and admiration of his dignity, simplicity and unselfishness, and our recognition of the fine example of true Americanism that he has set for all. No Division had a more beloved leader."

In their main business meeting on August 29th, the convention delegates elected as Association president Mr. Lon P. MacFarland, former Division G-2 and now a resident of Columbia, Tennessee. In his acceptance speech MacFarland pledged himself to do his best to continue the precedents and policies established by his illustrious predecessor, General Oliver.

General Oliver, who was president of the Association from its organization on September 11, 1946 until this first Convention, expressed himself as being extremely well pleased at the members' choice for his successor. The General, when he accepted the post of president over a year ago, stated that he would serve only until a successor could be chosen from among the civilian ranks of former division members at their first convention, and held consistently to this position during his term of office.

Other officers elected were: To be Vice Presidents: William Malpede (CCB), Ed Murphy (22), and Hal Schiering (81), and Secretary-Treasurer, G. J. Cicone. Members of the Board of Directors were elected as follows: to serve one year: Rene Primeau (34), Harry Entrekin (Div. Hq.), Martin Philipsborn (CCB), and Armund Schoen (71); to serve two years: William R. Fullerton (Div. Hq.), Al Beer (CCR), George E. Baker (34), L. Gifford Kessler (387), and James V. Swift (Div. Hq.); to serve for three years: Colonel Glenn Anderson, USA Ret. (CCR), Bill Reynolds (22), Dave Batey (CCA), Richard Rosner (15), and Roland Biersach (127).

Members chosen to the Honorary Board of Governors were: Major General Oliver, Chairman; Major General Jack Heard, Brigadier General Eugene Regnier, Colonel Douglas Page, Colonel John T. Cole, Colonel Glenn H. Anderson, Lieutenant Colonel William Hamberg, Lieutenant Colonel F. E. Ressegieu, Lieutenant Colonel John S. Wintermute, and Lieutenant Colonel Thomas Bartel.

6th Armored Division

The Sixth Armored Division Association is now a going concern and the response from the initial letter announcing the formation of the Association has been gratifying.

Our first Newsletter has been mailed to over 7,000 former members of the Division and is expected to assist materially in our membership drive.

Local chapters will be organized shortly and further information on this subject will be furnished at an early date.

The following units have had scheduled reunions: Co. B, 9th A.I.B., Louisville, Kentucky, on July 28; 68th Tank Battalion, Chicago, on August 30; Troop E, 86th Cav. Recon. Sq., New York City, in October; Co. A, 69th Tank Battalion, Philadelphia, on April 17.

The Association is still in need of quite a number of addresses in order to complete our files. Anyone having addresses of former Division members or those seeking additional information should contact H. C. Smith, Secretary-Treasurer, 6th Armored Division Association, Fort Knox, Kentucky.

11th Armored Division

You will all be very glad to know that the Convention at the Congress Hotel in Chicago on August 14, 15 and 16 was a huge success, and due, in no small part, to Bill Lipp and the entire Chicago Chapter of the Eleventh. They deserve a fine round of applause for their hard work and untiring efforts to make the convention one that will be remembered for some time to come. The attendance far exceeded everyone's expectations and there were representatives from coast to coast—a grand time was had by all who were there. Many who expected to, but at the last minute for one reason or another could not, sent telegrams of good wishes and congratulations, and these were read at the business meetings. Several of the former Commanding Officers sent letters of regret that they could not attend.

We'll try to give you a few of the "highlights" of the convention—A Board of Governors was nominated and elected by the entire membership present at the business meeting—as follows:

Ted Cronyn, II (Retiring President), Hill Blalock, Willard A. Holbrook, Jr., Harry Muller, George D. Halprin, Bernard Walker, Warren Melgaard, William L. Lipp.

The Board of Governors, in turn, elected the Association Officers for the new term, to serve until the next convention business meeting, as listed:

George D. Halprin (N.Y.) President; Willard A. Holbrook, Jr. (D.C.), 1st Vice President; George F. Falvella (N.Y.), 2d Vice President; William F. Lightholder (N.Y.), 3d Vice President; Morris D. Stolar (D.C.) Secretary-Treasurer; Rev. William Hamilton (Conn.), Chaplain; Albert H. Buschmann (N.Y.), Counsel, and Alfred E. Dugan (N.Y.), Assistant Counsel.

Everyone will be glad to know that General Charles S. (Pete) Kilburn came all the way from California to attend the convention and was made an Honorary President of the Association, by unanimous acclaim. Upon being asked at the meeting, just why he left the Division—he stated the reason in no uncertain terms to the entire membership present—and he was given a thunderous applause and resounding cheers. It's a wonder that "Pete" was able to raise his right arm—after all the handshaking and good wishes he received. Incidentally, he was heard to say "that all the money in the world couldn't buy the respect and admiration shown him by the boys of the Eleventh."

Ted Cronyn gave all the credit for the formation of the association to Willard A. Holbrook, and he was given a big hand by the membership for the grand work done during the past year, as were the other "retiring officers." Gen. Holbrook very graciously praised the staff of the ARMORED CAVALRY JOURNAL for their assistance and ideas given him, in the establishing of the association and it was agreed by all present to keep the offices in Washington, D. C., at least until the next election of officers at the 1948 convention.

After nominations for various convention "sites" for 1948—New York City was generally voted for and the date to be around the middle of August . . . so . . . all of you begin planning to attend, so we will have even a bigger and better convention, than held in Chicago.

Most of the units of the Eleventh were well represented at the convention, except those for whom we did not have complete rosters, but I think there were members from every unit present—and they hailed from coast to coast. We wish to acknowledge receipt of Hq. & Hq. Co. of the 81st Medics, also Co. "B" of the 55th A.I.B. which were sent in to us by members. We hope to obtain all of the missing rosters in time to contact individuals regarding the 1948 convention.

There were many little informal get-togethers of the various units—John Janecek of Lincoln, Nebr. got the Band members together—but none of them brought their instruments, so there was no "jam session." The 133d ORD seemed to be well represented at the convention and their Headquarters were (unofficially, of course) George Halprin's and Jim Miller's suite. The Tavern and Casino Rooms had their share of fellows "remembering this and that" and everyone seemed to be enjoying seeing each other again after such a long time. Many pictures were being taken at the Dinner Dance and we spotted Warren Melgaard's father taking informal shots of folks on the dance floor, as well as the 22d Tank boys. The music and the floor show at the dance were superb and the array of feminine pulchritude the Thunderbolts escorted to the dance was pleasant to behold.

There was quite a large crowd at the Luncheon on Friday at which Maj. Gen. Leslie Groves was the principal speaker and Bob Race acted as M.C. Chaplain Rhea of Fort Sheridan was also a guest at the Luncheon. By the way, if any of you would like a copy of the "group" picture taken at the luncheon, you may get one from Oscar & Associates, located at 43 East Adams Street, Chicago 3, Illinois, for $1.50.

We had hoped to have some "local chapter" news for you in these notes, but we haven't anything official. Guess everyone has been too engrossed with the convention to give us the latest dope on what's been going on. Willard Rayburn (133d ORD) who attended the Los Angeles first meeting on July 24th, told us at the convention that they had a good turnout. We will do our best in future notes in this column to give you an account of the activities of the individual local chapters, when and where their meetings will be, so if you are in the "neighborhood" you can drop in and meet the boys and say "hello." Now that the convention is over, we hope to get many more local chapters going full swing in various parts of the country, and we will let you know where they are and whom to contact, if you are interested in joining any of them.

We are planning to get a NEWSLETTER out to the entire membership by the end of September, giving a full report on the business meetings, the election of officers, a financial report of the Association and a booklet containing the Constitution adopted at the Convention and the Incorporation of the Association. The 1948 Membership cards will be sent out, as soon as 1948 dues are received (they are due on August 15th for the coming year, and membership cards expire on August 15th, as stated in the Constitution).

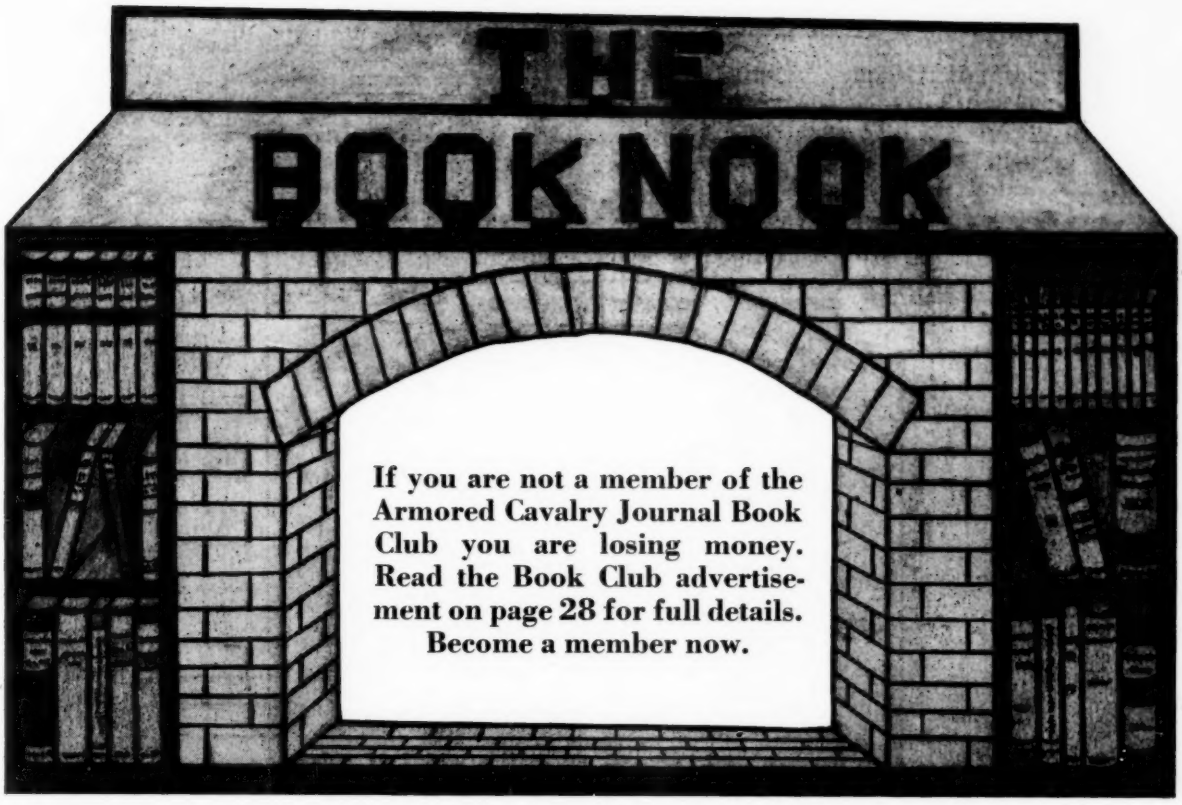
The Washington, D. C. Chapter is having a meeting on Sept. 5th at the Headquarters offices, to help select pictures to be used in the Division History.

Paul Cratty of the Boston area was at the convention and he hopes to have the Boston Chapter organized in a short time. We told members at the convention that were interested in forming local chapters to get in touch with us, listing the names of the near-by towns they wished included in their local chapter area.

If you attended the convention in Chicago . . . we are glad you could come and we know you had a good time . . . if you didn't, we hope you will try to make every possible effort to be at the next one in New York City. Full information will be sent out about it, in time for everyone to make the proper reservations and plans to attend. George Halprin and the New York Chapter will be the hosts for the 1948 convention and we know they will do a good job of it.

LET'S HAVE ALL 48 States AT THE '48 CONVENTION.

★ ★ ★ ★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THE HARD WAY HOME. By Colonel William C. Braly. Infantry Journal Press. $3.50.

The Hard Way Home is the terrifying story of the inhuman treatment that was dealt American prisoners of war by the Japanese all the way from the Philippines through Formosa, Japan, and Manchuria. From page to page it revives the reader's hatred for cruel, ruthless, inhuman, and indecent Japs.

Brutality of the Japs began almost from the moment the first Americans were taken prisoner in the Philippines. Colonel Braly recounts an early incident at the beginning of Chapter Two. "One American soldier, in mortal agony with both legs and one arm badly mutilated and the other arm less seriously wounded, was refused medical attention by the Japanese. He was attempting to shoot himself and, being unable to do so, asked Private John R. Brown, Battery A, 60th Coast Artillery, to do it for him. Seeing his condition and knowing that otherwise he would die horribly, Brown did so. As a result, Brown and a man from the 803d Engineers whom the Japs claimed had been insubordinate were taken down to the beach and the reports of a submachine gun were heard. Neither of the men returned nor was ever seen again."

This book brings home the fact that the privates and noncommissioned officers who inflicted this suffering in contravention of all the rules of warfare were themselves "Japanese people," and were not necessarily those with a lifetime of military service behind them. The peasant private and the Tokyo noncom alike took great delight in inflicting tortures and indignities on their prisoners. Such should be kept in mind by those who are inclined to forgive the Japs their sins with complete and irresponsible forgetfulness.

"Think what a feeling of pride and superiority it must have given a Jap private soldier to slap a ranking white officer's face at will—especially gray-haired ones! Also, think how much 'face' the officer lost to have to stand there ignominiously on the receiving end," Colonel Braly writes in the fifth chapter of his book.

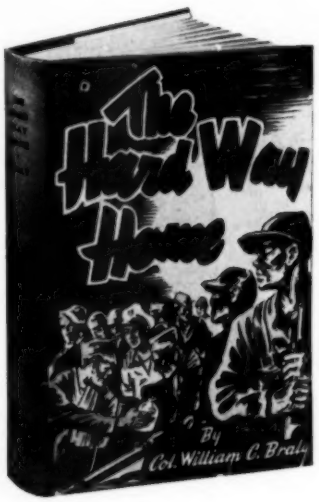
The author tells the story of four enlisted men who escaped from the notorious Cabanatuan Prison Camp on Luzon in hopes of bettering their lot. On the second day of their escape they hailed a truck that unfortunately contained Jap soldiers and were returned to the camp and locked up. The next day four posts were set in the ground in front of the Japanese Headquarters. The POW was then forced to squat by one while the guards tied his hands and feet behind the post. In this position they inserted a 4x4 timber behind the man's knees. It was studied torture. All that day and the next day these men were left in that position in the blistering sun without food or water.

"In the afternoon, around four o'clock, the Camp Commander, the Interpreter, eight guards with rifles, and several others with shovels arrived at the guardhouse. The prisoners were untied but were so cramped it was three or four minutes before they could stand up.

"They were then marched to a point about 400 yards from the Headquarters building and in full view of over 6500 other Americans. The four men stepped down into a depression which was either a common grave or four individual graves. They were given something, perhaps a cigarette, I could not tell, and then were blindfolded.

"The eight guards with rifles advanced four abreast, halted, raised their rifles to their shoulders, and with muzzles slightly depressed, pointing at the prisoners, they fired at a distance of about four feet. All dropped. One

EVERY AMERICAN SHOULD READ



By Colonel William C. Braly

What happens when an officer of the United States Army, a man who has spent his life in the service, and is known and respected from Corregidor to Fort Williams, Maine, is told he is lower than the lowest Japanese private? How can he keep his self-respect when he is slapped, with or without provocation, by any stray Jap soldiers who happen to pass by? How can he keep his sense of humor when he is shivering in rags, underfed, overworked?

Colonel William C. Braly answers these questions —and poses many more. In *The Hard Way Home* he tells of the privates and noncoms who inflicted suffering on Americans in contravention of all the rules of warfare. He brings home the fact that the Japs responsible for brutality were the "Japanese people" that are being forgiven for their sins today.

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man raised an arm as though in an effort to rise. There was one more shot, then all was quiet. The Jap shovel detail filled in the graves, then all of them returned to camp.

"Later the Interpreter said to me, 'The Camp Commander was very lenient as the prisoners probably did not realize the seriousness of their offense.'

"What do you mean 'lenient'?" I asked angrily.

" 'I mean that in future all other men in that squad will be shot also,' was his reply."

Every American should read this book. He should read it now. This book will make an impression on a reader's mind that he will not soon forget.

* * *

HISTORY OF THE 91ST CAVALRY RECONNAISSANCE TROOP MECHANIZED. By Captain Clifford E. Lippincott, Sergeant Sheldon C. Eller, and Technician Fifth Grade Ebber K. Haltman. Garrett and Massie, Inc.

This 72-page booklet is the complete World War II history of the 91st Cavalry Reconnaissance Troop Mechanized written by the ex-commanding officer and two of the Troop's enlisted men. In addition to being a history it also contains a roster of the Troop.

* * *

KNOCK ON ANY DOOR. By Willard Motley. D. Appleton-Century Company. $3.00.

Knock On Any Door is the story of Nick Romane, a sensitive American boy in a large city (Chicago) who dreamed of stars but stumbled into a gutter. In this, his first novel, Willard Motley has caught the pulse beat of a great American metropolis of today.

Such human characters run through the book as: Grant Holloway, who observed the harshness of life from his comfortable eminence as an established writer; Riley, the swaggering cop with three notches (for three dead men) in his gun belt; Judge Drake, calm and kindly on the bench; Rosa, the fat and understanding aunt who loved Nick and could not save him; Julian, the brother who was willing to work for his security; Kerman, the prosecutor who would stoop to any low trick to get a conviction; Juan, who couldn't be beaten out of his Mexican code of honor even by police nightsticks; Owen, the old man who loved Nick as something more than a son; and dozens of others who crowd the pages of this novel with vivid life.

* * *

FORGING THE THUNDERBOLT. By Mildred H. Gillie. The Military Service Publishing Company. $4.00.

This book, which has a foreword by General Jacob L. Devers, is a history of the development of the Armored Force. The only qualification the author has for writing this book, it seems, is that she knew Mrs. Adna Romanza Chaffee, widow of General Chaffee.

FOUR STARS OF HELL. By Laurence Critchell. With a Foreword by Lieutenant General Lewis Brereton. The Declan X. McMullen Company. $3.75.

This book tells the straightforward and exciting history of the part airborne infantry played in the European victory. The author, Captain Critchell, accompanied his unit through its early specialized training, the invasion of Normandy, the assault at Nijmegen, the Battle of the Bulge, and the swift race to Berchtesgaden.

While the book is intended as a record of the 501st Parachute Regiment, the history of the entire 101st Airborne Division is seen running through its pages.

LINDEN ON THE SAUGUS BRANCH. By Elliot Paul. Random House. $3.50.

Boyhood recollections of life in a New England town is what the content of this book is woven around. It is full of turn-of-the-century scenes built around Mr. Paul's boyhood. In the book are found anecdotes, character sketches, comedies, tragedies, and embellished observations.

PRACTICAL DOPE ON THE .22. By F. C. Ness. The Military Service Publishing Company. $4.00.

F. C. Ness, editor of the *Dope Bag* and technical advisor to the *American Rifleman*, has written a book that should be in the library of every owner of a .22. This book is based on nearly 40 years of shooting experience.

DARK DECEMBER. By Robert E. Merriam. Ziff-Davis Publishing Company. $3.00.

This book is the story of the greatest pitched battle on the Western Front in World War II. Commonly known as "The Battle of the Bulge," it involved 29 German and 32 Allied divisions. Over a million men fought together, often in utter confusion and chaos, in the frozen forests of the Ardennes during the wintry weeks of December, 1944, and early January, 1945.

Dark December unfolds the whole dramatic story, from the conception of the plan to the final crumbling of the threat to Antwerp and the apologetic statements to Hitler by the German command.

The author has done an excellent job in the reconstruction of this great battle. He has written a book that will be read by every serious student of military history and science.

TO THE BITTER END. By Hans Bernd Gisevius. Translated from the German by Richard and Clara Winston. Houghton Mifflin Company. $4.00.

The author, who was one of the leaders of the German anti-Nazi underground, traces the macabre pattern of scandal, blackmail, betrayal, intrigue, paradox, and tragedy by which the Nazis took and held power. The book is a brilliant informal history of the Third Reich.

Already a best seller in Switzerland, Sweden, and France, *To The Bitter End* is of historical importance.

The ABC Of Horse Racing

By Dan Parker

This book written by the sports editor of the New York *Daily Mirror* tells everything about horse racing. It covers betting, form sheets, systems, rules, history, etc. It tells you the pitfalls awaiting the race-track patron and how to avoid them.

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This little 20-page booklet on the history of the First Cavalry Division is historical in itself. It was printed on the presses of the Santo Tomas University in Manila shortly after the notorious Santo Tomas Internment Camp was liberated by First Cavalry Division troopers. Only a few copies of this booklet remain. Order now while the supply lasts.

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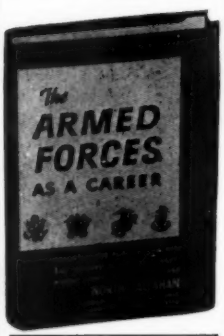

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CONQUER. THE STORY OF NINTH ARMY. Infantry Journal Press. $4.50.

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THE ART OF WAR ON LAND. By Lieutenant Colonel Alfred H. Burne. The Military Service Publishing Company. $2.50.

Colonel Burne trys to pin down the facts in this book that answers that all-important question, "What wins wars?" He does this by postulating the basic facts of war, and then classifying them. With these facts and theories as a foundation, he examines and analyzes a series of outstanding battles and campaigns in world history. His searching and capable story ranges from the earliest reliably recorded battle—Kadesh, 1288 B.C.—to the Tunis campaign of World War II.

HATCHER'S NOTEBOOK. By Major General Julian S. Hatcher. The Military Service Publishing Company. $5.00.

Here are the definitive answers to thousands of questions that have puzzled shooters, gunsmiths, collectors, hunters, ballisticians, and every other type of weapons enthusiasts.

RIMFIRE RIFLEMAN. By Edwards Brown, Jr. The Military Service Publishing Company. $4.00.

Rimfire Rifleman is really a two-part book. The first part is the story woven around a newcomer to small-bore shooting. The second part is a reference work in which the author has compiled by far the finest and most complete set of subjects on small-bore rifle shooting we have yet seen.

OR FORFEIT FREEDOM. By Robert Wood Johnson. Doubleday & Company, Inc. $2.50.

Mr. Johnson explains in clear and simple terms why business in this country has lost public confidence to such an alarming degree, why there is so much labor-management conflict today, and what should be done about it.

The remedies he proposes in his book for today's business and labor headaches include: (1) Improved training and all-round education of workers; (2) Development of a new craftsmanship superior to that destroyed by modern industrialization; (3) Realism in dealing with unions and improved interpretation of contracts; (4) Good community relations and decentralization of industry to provide the human element without which neither executives nor workers can do a job; and (5) Above all, a production program bold enough to furnish a decent living for all.

DOWN RAMP! THE STORY OF THE ARMY AMPHIBIAN ENGINEERS. By Brigadier General William F. Heavey. Infantry Journal Press. $5.00.

This book presents the accomplishments and operations of the Amphibian Engineers in World War II. It is the story of the six brigades and the two separate battalions the Corps of Engineers launched to help win the Victory.

The author, General Heavey, commanded the 2d Amphibian Engineer Brigade all through the war in the Pacific. No better qualified person could be found than General Heavey to write this book.

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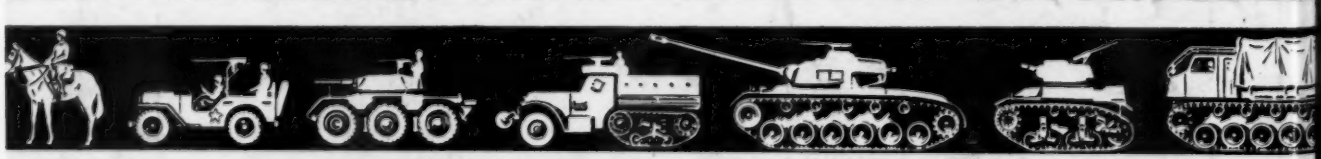
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